# 2017 General Rate Application

## Volume II

**July 28, 2017**
**Revised - September 15, 2017**
**Revised - October 17, 2017**

newfoundland labrador hydro

# Table of Contents

**VOLUME I — Application and Company Evidence**

**Application**

**Company Evidence**


| | **Chapter 1 Corporate Overview** | **Page** |
|---|---|---|
| 1.1 | Introduction | 1.1 |
| 1.2 | Managing Customer Electricity Rates in Transition to Interconnection with the North American Grid | 1.8 |
| 1.3 | Corporate Organization | 1.12 |
| 1.4 | Customer Service and Satisfaction | 1.14 |
| 1.5 | Safe and Reliable Operations | 1.16 |
| 1.6 | Financial Performance | 1.20 |
| 1.7 | Conclusion | 1.21 |
| | **Chapter 2 Customers** | |
| 2.1 | Overview | 2.1 |
| 2.2 | Serving Customers | 2.3 |
| 2.3 | Measuring Customer Satisfaction | 2.8 |
| 2.4 | Balancing Customer Service and Costs | 2.11 |
| 2.5 | Conservation and Demand Management | 2.13 |
| 2.6 | Net Metering | 2.16 |
| 2.7 | Identification of the Rural Subsidy on Customer Bills | 2.17 |
| 2.8 | Conclusion | 2.17 |
| | **Chapter 3 Operations** | |
| 3.1 | Overview | 3.1 |
| 3.2 | Hydro's Organizational Structure | 3.2 |
| 3.3 | Reliability and Customer Focus | 3.4 |
| 3.4 | Reliable Operations – System Performance | 3.8 |
| 3.5 | System Planning and Meeting Customer Load Requirements | 3.14 |
| 3.6 | Rural Deficit | 3.31 |
| 3.7 | 2018 and 2019 Operating and Capital Costs | 3.33 |
| 3.8 | Island Interconnection with the North American Grid | 3.43 |
| 3.9 | Conclusion | 3.46 |




newfoundland labrador hydro
a nalcor energy company

# Table of Contents
## (cont'd)


| Chapter 4 Finance | | Page |
|---|---|---|
| 4.1 | Overview | 4.1 |
| 4.2 | 2018 Test Year and 2019 Test Year Revenue Requirement | 4.3 |
| 4.3 | Average Rate Base | 4.8 |
| 4.4 | Return and Capital Structure | 4.12 |
| 4.5 | Return on Rate Base | 4.14 |
| 4.6 | Other Matters | 4.15 |
| 4.7 | Hydro's Proposals | 4.17 |

**Chapter 5 Rates and Regulations**

| | | |
|---|---|---|
| 5.1 | Overview | 5.1 |
| 5.2 | Cost of Service Methodology Review | 5.2 |
| 5.3 | 2017 GRA Cost of Service Methodology Proposals | 5.7 |
| 5.4 | Recovery of Revenue Requirement | 5.13 |
| 5.5 | Supply Cost Deferral Accounts | 5.16 |
| 5.6 | Rate Design for Newfoundland Power | 5.17 |
| 5.7 | Rate for Island Industrial Customers | 5.24 |
| 5.8 | Rates for Rural Customers | 5.29 |
| 5.9 | Labrador Industrial Rates | 5.33 |
| 5.10 | Summary | 5.37 |

**List of Abbreviations**

**VOLUME II – Exhibits**

| | |
|---|---|
| Exhibit 1 | Provincial Electrical System |
| Exhibit 2 | Organizational Responsibility |
| Exhibit 3 | Customer Service Roadmap Update |
| Exhibit 4 | Report on Rural Subsidy Communication to Customers |
| Exhibit 5 | Intercompany Transactions Costing Guidelines |
| Exhibit 6 | Capital Expenditures and Carryover Reports, 2015, and 2016 |
| Exhibit 7 | Annual Reports on Key Performance Indicators, 2014, 2015, and 2016 |
| Exhibit 8 | Holyrood Decommissioning Study |
| Exhibit 9 | Working Capital Methodology |
| Exhibit 10 | Average Rate Base Methodology |
| Exhibit 11 | 2016 Depreciation Study, Revision 1 |
| Exhibit 12 | Automatic Return on Equity Adjustment Report |
| Exhibit 13 | Cost of Service Expert Evidence |

**VOLUME III – Exhibits**

| | |
|---|---|
| Exhibit 14 | 2018 Test Year Cost of Service Study |
| Exhibit 15 | 2019 Test Year Cost of Service Study |
| Exhibit 16 | Interim Rates, Rules and Regulations |
| Exhibit 17 | Final Rates, Rules and Regulations |

**Exhibit 1 – Provincial Electrical System**

# Provincial Electrical System

**July 2017**

## Table of Contents

1.0 Overview ..... 1

1.1 Island Interconnected ..... 1

1.2 Labrador Interconnected ..... 4

1.3 Rural Interconnected Distribution ..... 6

1.4 Hydro – Rural Isolated ..... 6

## List of Schedules

Schedule I – Provincial Generation and Transmission Grid

Schedule II – Island Interconnected System 2018/2019 Plant Assignment

Schedule III – Generating Capacity 2015

Schedule IV – Labrador Interconnected System 2018/2019 Plant Assignment

Schedule V – TRO Communities Served by Interconnected Systems & Diesel Systems - Island

Schedule VI – TRO Communities Served by Interconnected Systems & Diesel Systems - Labrador

Schedule VII – Isolated Rural Systems Installed Generating Capacity

# 1.0 Overview

Newfoundland and Labrador Hydro (Hydro) owns and operates two interconnected power systems, one on the Island and the other in Labrador. As well, Hydro owns and operates 21 isolated generation and distribution systems located around coastal Newfoundland and Labrador,[1] and numerous distribution systems on the Island Interconnected System, primarily on the Great Northern Peninsula, the South Coast and the White Bay-Baie Verte area, as well as the Labrador Interconnected System. The below information is consistent with the proposed arrangement of the electrical system to the end of 2019.

## 1.1 Island Interconnected

On the Island Interconnected System, capacity and energy are provided by Hydro through a mix of hydroelectric and fossil-fired generation, as well as power purchases. This generation, along with the transmission system, is operated by Hydro's Energy Control Centre (ECC) to ensure the economic and reliable dispatch of available resources.

On the Island Interconnected System, Hydro owns and maintains approximately 3,500 km of high voltage lines, and more than 50 high voltage terminal stations operating at 230, 138 and 69/66 kV which connect to the generation and the delivery points for Newfoundland Power Inc., the Island Industrial Customers, and Hydro's rural distribution systems.

The general location of Hydro's Island facilities are indicated in Schedule I. A single line diagram of the Island Interconnected System 2018/2019 Plant Assignments is provided in Schedule II.

Since Hydro's last general rate application, the following additions and removals have been made to or are planned for the Island Interconnected System. These will be assigned to the Cost of Service areas consistent with Board of Commissioners of Public Utilities (the Board) approved

[1] Hydro also operates the Natuashish generation and distribution system on behalf of the Mushuau Innu First Nation.

methodology as follows:

- Addition of six mobile diesel units (total capacity of 10 MW) at Holyrood Terminal Station – assigned as common;
- Oxen Pond transformer T3, rated for 75/100/125 MVA, was relocated to Hardwoods Terminal Station and went in service as Hardwoods T1 in 2015 – assigned as common;
- Oxen Pond transformer T1, rated for 40/53.3/ 66.6 MVA, was relocated to Hardwoods as Hardwoods Spare T7S in 2014 – assigned as common;
- Hardwoods transformer T1, rated for 40/53.3/ 66.6 MVA, was removed from service in 2015 and became Hardwoods Spare T6S – assigned as common;
- Holyrood transformer T8, rated for 75/100/125 MVA, was relocated to Sunnyside to replace transformer T1 in 2014 – assigned as common. A new transformer, rated for 75/100/125 MVA, was installed for Holyrood T8 in 2014 – assigned as common;
- Replacement of 230/13.8 kV transformer T7 at Bay d'Espoir in 2016 with 129/172 MVA unit – assigned as common;
- Replacement of 230/13.8 kV transformer T1 at Cat Arm in 2016 with 60/80 MVA unit – assigned as common;
- Addition of a third 230 kV transmission line between Bay d'Espoir Terminal Station and Western Avalon Terminal Station, TL267, and associated terminal station reconfigurations are due to be complete in 2017 – assigned as common;
- Addition of a 230 kV Terminal Station at Soldiers Pond, as well as a 230 kVac – 350 kVdc Converter Station for the Labrador Island Link, three 175 MVAR Synchronous Condensers, and six 75 MVAR filters – assigned as owned by others;[2]
- Reconfiguration of the 230 kV transmission lines on the Avalon Peninsula due to interconnection at Soldiers Pond Terminal Station – all transmission lines assigned as common, including;
    - TL201 – Western Avalon to Soldiers Pond,
    - TL217 – Western Avalon to Soldiers Pond,

[2] These assets are not yet in-service. Hydro is not seeking cost recovery in this General Rate Application.

- TL242 – Soldiers Pond to Hardwoods,
- TL265 – Soldiers Pond to Holyrood (eastern portion of old TL217),
- TL266 – Soldiers Pond to Hardwoods (eastern portion of old TL201),[3] and
- TL268 – Soldiers Pond to Holyrood (western portion of old TL242);

- Rebuild of 230 kV transmission line TL266 between Soldiers Pond Terminal Station and Hardwoods Terminal Station to be completed in 2017 – assigned as common;
- Addition of 230 kV Granite Canal Tap Terminal Station, as well as a 15 MVAR reactor – assigned as owned by others;[4]
- Reconfiguration of 230 kV transmission line TL263 such that it ties in to Granite Canal Tap Terminal Station, with the remaining portion of the line renamed as TL270 to connect Granite Canal Tap Terminal Station to Granite Canal Generating Station – assigned as common;[5]
- Addition of a second 230 kV Terminal Station at Bottom Brook, as well as a 230 kVac – 200 kVdc Converter Station for the Maritime Link, and one 60 MVAR filter – assigned as owned by others;[6]
- Reconfiguration of 230 kV transmission lines TL211, TL233 and TL209 such that they tie in to Bottom Brook Terminal Station 2 instead of the original Bottom Brook Terminal Station– assigned as common;[7]
- Addition of 230 kV transmission line TL269, connecting Bottom Brook Terminal Station 2 and Granite Canal Tap Terminal Station – assigned as owned by others;[8]
- Addition of the 500 MW, 200 kVdc Maritime Island Link – assigned as owned by others;[9]
- [][10] and

[3] This work was new construction to replace a section of TL201 from Soldiers Pond to Hardwoods
[4] These assets are not yet in-service. Hydro is not seeking cost recovery in this General Rate Application.
[5] ibid.
[6] ibid.
[7] ibid.
[8] Ibid.
[9] ibid.
[10] []

- [ ][11]

Hydro's Island Interconnected System production facilities consist of hydroelectric, thermal, and standby generating facilities that vary in size from less than 1 MW to 613 MW. Hydro's Island Interconnected System installed capacity totals 1699 MW. Hydro also has a number of power purchase agreements with Non-Utility Generators to provide additional power to the system. Including these contracts, the total installed capacity for the Island Interconnected System is 2132 MW. For 2017 through to the 2018 and 2019 Test Years, the total from all power purchases is forecast to provide approximately 14% annually of Hydro's Island Interconnected total net energy supply. Schedule III provides the provincial interconnected generation capability.

## 1.2 Labrador Interconnected

The majority of power and energy for the Labrador Interconnected System is purchased from Churchill Falls (Labrador) Corporation Ltd. Hydro has a total of 300 MW and 2,362 GWh available annually through Recapture Energy, and 225 MW and 1,971 GWh per year through the TwinCo Block.[12] Hydro also maintains gas turbine and diesel assets in the Labrador Interconnected System with a combined capacity of 30 MW.[13]

Hydro owns and maintains 269 km of 3-phase 138 kV transmission line and the associated terminal stations in Labrador, interconnecting Happy Valley/Goose Bay to Churchill Falls, two parallel 3-phase 230 kV transmission lines (each line having a length of approximately 216 km)

[11] [ ]

[12] On May 12, 1969, Hydro-Quebec (HQ) and the Churchill Falls (Labrador) Corporation (CF(L)Co) entered into a power contract for the purchase of power from the CF(L)Co plant by HQ (the 1969 Power Contract). Pursuant to section 6.6 of the 1969 Power Contract, CF(L)Co has exercised its right to recapture 300 MW of power (Recapture Energy) generated at the CF power plant. Under the terms of a PPA between Hydro and CF(L)Co (the NLH-CF(L)Co PPA) dated March 9, 1998, and amended on April 1, 1999, Hydro is able to, and does, purchase up to 300 MW of Recapture Energy from CF(L)Co for use outside of the Province of Quebec. Under the terms of the HQ-Hydro Shareholders Agreement governing the operation of the Churchill Falls plant, CF(L)Co must make a firm 225 MW block of power and energy available to Hydro for distribution and use in Labrador West.

[13] The Happy Valley North Plant has been de-rated to 5 MW due to a fire in January 2012.

and the associated terminal stations interconnecting Labrador West to Churchill Falls and over 44 km of 46 kV sub-transmission lines in Labrador West.

The general location of Hydro's facilities in Labrador are indicated in Schedule I. A single line diagram of the Labrador Interconnected System 2018/2019 Plant Assignments is provided in Schedule IV. Since Hydro's last general rate application the following additions were made or are planned to be made to the Labrador Interconnected System.

- Addition of 138/25 kV transformer T4, rated for 15/20/28 MVA, in Happy Valley Terminal Station in 2016 – assigned to common;
- Addition of 735/315 kV Churchill Falls Terminal Station 2 – assigned as owned by others;
- Addition of 315/138/25 kV Muskrat Falls Terminal Station 2, as well as a 315 kVac – 350 kVdc Converter Station for the Labrador Island Link, the 824 MW Muskrat Falls Generating Station (under construction), and five 72 MVAR filters – assigned as owned by others;
- Addition of two 315 kV transmission lines L3101 and L3102, connecting Churchill Falls Terminal Station 2 and Muskrat Falls Terminal Station 2 – assigned as owned by others;[14]
- Addition of the 830 MW, 350 kVdc Labrador Island Link – assigned as owned by others;[15]
- 230/46 kV Wabush Terminal Station (with the exception of Synchronous Condenser 3 and transformer T6) and 230 kV transmission line L2304 and L2303 assignments changed from owned by others to common;
- Addition of load from Great North Data on Wabush Terminal Station feeder L32 – assigned as Hydro Rural; and
- Addition of 46/12.5 kV transformer T6, rated for 10/13.33/16.67 MVA, in Wabush Substation in 2014. Load was transferred from feeder L12 to L3 to off-load transformer T3 and add more load to the larger transformer T6 – assigned as Hydro Rural.

[14] These assets are not yet in-service. Hydro is not seeking cost recovery in this General Rate Application.
[15] ibid

### 1.3 Rural Interconnected Distribution

On the Island Interconnected System, Hydro owns and maintains approximately 2,260 km of low voltage (up to 25 kV) distribution lines and 45 low voltage substations, which serve approximately 22,900 Rural Customers.[16] These Rural Customers are served from distribution systems located in approximately 180 communities on the South Coast, Northeast Coast, and along the Great Northern Peninsula.

On the Labrador Interconnected System, Hydro owns and maintains approximately 350 km of low voltage distribution lines and seven substations, serving six communities with approximately 11,200 Rural Customers.

The general location of these service areas, as well as the isolated service areas are provided in Schedules V and VI.

### 1.4 Hydro – Rural Isolated

Hydro owns and operates 21 isolated diesel generating and distribution systems serving approximately 4,500 customers[17] in over 40 communities throughout coastal Newfoundland and Labrador.[18] Fifteen of these systems are located in Labrador and six are on the island of Newfoundland.

Schedules V and VI show the location of these isolated diesel generating plants and Schedule VII provides a breakdown of their proposed installed capacity as of December 31, 2019. The total installed capacity of Hydro's 21 isolated diesel plants is approximately 37.0 MW.

[16] Rural customer counts do not include street and area lighting customers.
[17] Ibid.
[18] Ibid., page 1

# Exhibit 1 – Schedule I

# Provincial Generation and Transmission Grid

# Provincial Generation and Transmission Grid

Revised: March 17, 2017

# Exhibit 1 – Schedule II

# Island Interconnected System 2018/2019 Plant Assignment

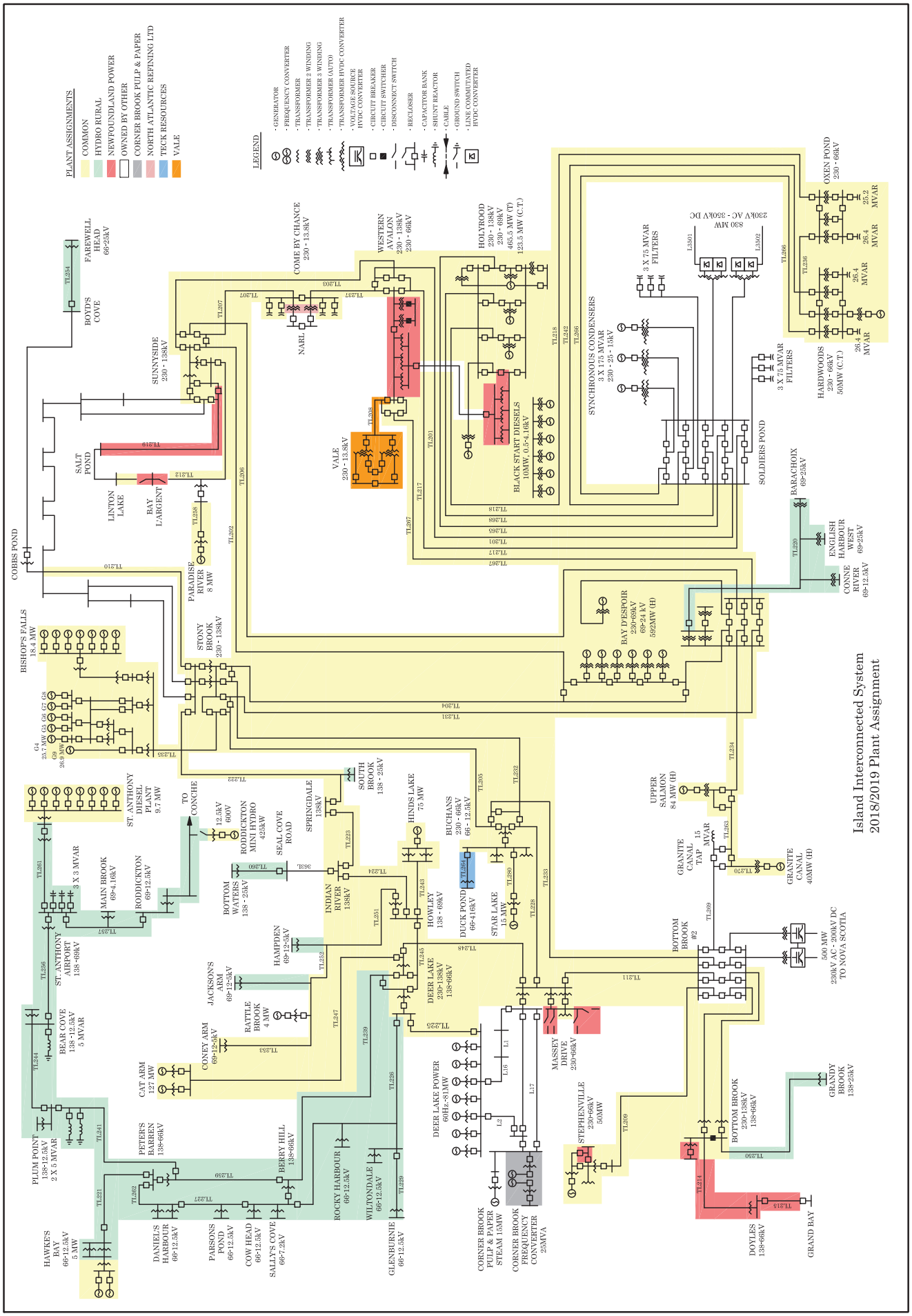

Island Interconnected System
2018/2019 Plant Assignment
PLANT ASSIGNMENTS
COMMON
HYDRO RURAL
NEWFOUNDLAND POWER
OWNED BY OTHER
CORNER BROOK PULP & PAPER
NORTH ATLANTIC REFINING LTD
TECK RESOURCES
VALE
LEGEND
- GENERATOR
- FREQUENCY CONVERTER
- TRANSFORMER
- TRANSFORMER 2 WINDING
- TRANSFORMER 3 WINDING
- TRANSFORMER (AUTO)
- TRANSFORMER HVDC CONVERTER
- VOLTAGE SOURCE HVDC CONVERTER
- CIRCUIT BREAKER
- CIRCUIT SWITCHER
- DISCONNECT SWITCH
- RECLOSER
- CAPACITOR BANK
- SHUNT REACTOR
- CABLE
- GROUND SWITCH
- LINE COMMUTATED HVDC CONVERTER
COBBS POND
PARADISE RIVER 8 MW
BISHOP'S FALLS 18.4 MW
G4 25.7 MW G5 G6 G7 G8 G9 36.9 MW
STONY BROOK 230 - 138kV
SUNNYSIDE 230 - 138kV
BOYD'S COVE
FAREWELL HEAD 66-25kV
SALT POND
LINTON LAKE
BAY LARGENT
COME BY CHANCE 230 - 13.8kV
NARL
WESTERN AVALON 230 - 138kV 230 - 66kV
VALE 230 - 13.8kV
HOLYROOD 230 - 138kV 230 - 69kV 465.5 MW (T) 123.5 MW (C.T.)
BLACK START DIESELS 10MW, 0.5+4.16kV
SYNCHRONOUS CONDENSERS 3 X 175 MVAR 230 - 25 - 15kV
3 X 75 MVAR FILTERS
830 MW 230kV AC - 350kV DC
3 X 75 MVAR FILTERS
SOLDIERS POND
HARDWOODS 230 - 66kV 50MW (C.T.)
OXEN POND 230 - 66kV
25.2 MVAR
26.4 MVAR
26.4 MVAR
26.4 MVAR
BARACHOIX 69-25kV
ENGLISH HARBOUR WEST 69-25kV
CONNE RIVER 69-12.5kV
BAY D'ESPOIR 230-69kV 69-24 kV 592MW (H)
UPPER SALMON 84 MW (H)
GRANITE CANAL TAP 15 MVAR
GRANITE CANAL 40MW (H)
BOTTOM BROOK #2
500 MW 230kV AC - 200kV DC TO NOVA SCOTIA
BOTTOM BROOK 230-138kV 138-66kV
GRANDY BROOK 138-25kV
GRAND BAY
DOYLES 138-66kV
MASSEY DRIVE 230-66kV
STEPHENVILLE 230-66kV 60MW
DEER LAKE POWER 60Hz-81MW
CORNER BROOK PULP & PAPER STEAM 15MW
CORNER BROOK FREQUENCY CONVERTER 25MVA
DEER LAKE 230-138kV 138-66kV
HINDS LAKE 75 MW
BUCHANS 230 - 66kV 66 - 12.5kV
DUCK POND 66-4.16kV
STAR LAKE 15 MW
HOWLEY 138 - 69kV
INDIAN RIVER 138kV
SOUTH BROOK 138 - 25kV
SPRINGDALE 138kV
SEAL COVE ROAD
RODDICKTON MINI HYDRO 425kW
12.5kV 600V
TO CONCHE
ST. ANTHONY DIESEL PLANT 9.7 MW
ST. ANTHONY AIRPORT 138 -66kV
3 X 3 MVAR
MAIN BROOK 69-4.16kV
RODDICKTON 69-12.5kV
BOTTOM WATERS 138 - 25kV
HAMPDEN 69-12.5kV
JACKSON'S ARM 69-12.5kV
RATTLE BROOK 4 MW
CONEY ARM 69-12.5kV
BEAR COVE 138 -12.5kV 5 MVAR
CAT ARM 127 MW
PLUM POINT 138-12.5kV 2 X 5 MVAR
PETER'S BARREN 138-66kV
BERRY HILL 138-66kV
ROCKY HARBOUR 66-12.5kV
WILTONDALE 66-12.5kV
GLENBURNIE 66-12.5kV
HAWKE'S BAY 66-12.5kV 5 MW
DANIEL'S HARBOUR 66-12.5kV
PARSONS POND 66-12.5kV
COW HEAD 66-12.5kV
SALLY'S COVE 66-7.2kV

**Exhibit 1 – Schedule III**

**Generating Capacity 2018**

# Newfoundland and Labrador Hydro
## Generating Capacity

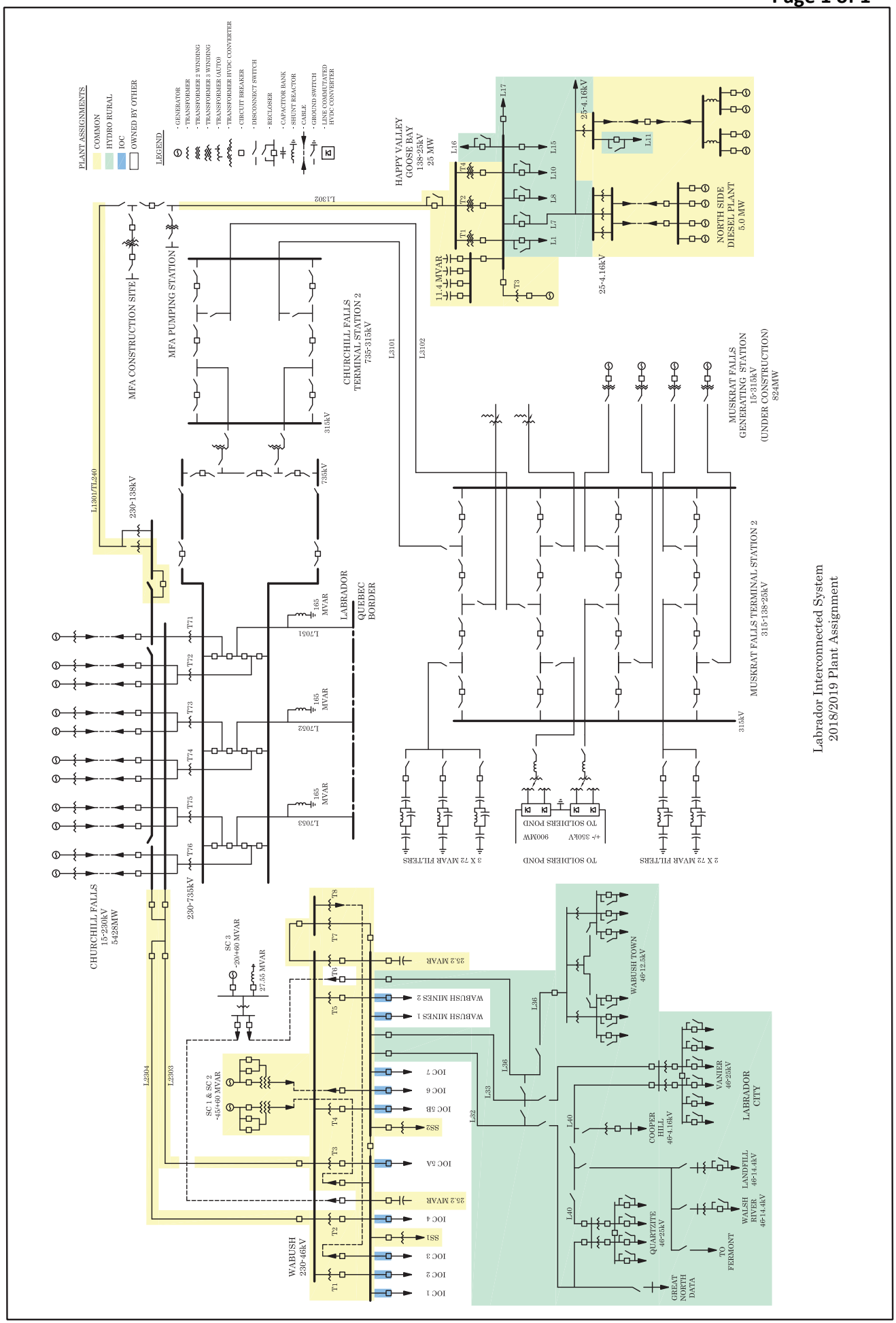
| Plant | Net Installed Capacity (MW) | Gross Continuous Unit Rating (MW) | Average Annual Energy (GWh) | Firm Annual Energy (GWh) |
|---|---|---|---|---|
| | | **Island Interconnected System** | | |
| Hydroelectric[2] | 959 | 954 | 4,600 | 3,961 |
| Thermal | 490 | 490 | 2,895 | 2,895 |
| Standby | 250 | 248 | - | - |
| Non-Utility Generation | 196 | 97 | 1,026 | 866 |
| **Total Capability** | **1,895** | **1,789** | **8,521** | **7,722** |
| Customer Generation[3] | 237 | 217 | 1,310 | 1,117 |
| **Total Island Interconnected System Capability** | **2,132** | **2,006** | **9,831** | **8,839** |
| Interruptible Contracts | | 113 | | |
| **Total Gross Continuous Unit Rating including Interruptible Contracts** | | **2,119** | | |
| | | **Labrador Interconnected System** | | |
| Happy Valley Gas Turbine | 27 | 27 | - | - |
| Goose Bay North Plant, Mud Lake | 5 | 5 | - | - |
| CF(L)Co. Supply[4] | 532 | 532 | 4,387 | 4,387 |
| **Total Labrador Interconnected System Capability** | **564** | **564** | | |

Note:

1. All values rounded to nearest MW or GWh.
2. Forecast assumes average inflows
3. Customer Generation average annual energy and firm annual energy reflect both 50 and 60 Hz energy for CBPP.
4. CF(L)Co. Supply includes both recapture and Twin Co. supply at CF Plant.

# Exhibit 1 – Schedule IV

# Labrador Interconnected System 2018/2019 Plant Assignment




Labrador Interconnected System
2018/2019 Plant Assignment

**Exhibit 1 – Schedule V**

**TRO Communities Served by Interconnected System & Diesel Systems - Island**

NOTE:

Name in capital letters (RED) denotes interconnection point with the bulk power system

Name in capital letters (GREEN) denotes location of the diesel generating plant.

# Communities Served by Interconnected Systems & Diesel Systems

**Exhibit 1 – Schedule VI**

**TRO Communities Served by Interconnected System & Diesel Systems - Labrador**

# Communities Served by Interconnected Systems & Diesel Systems

# Exhibit 1 – Schedule VII

# Isolated Rural Systems Installed Generating Capacity

**NEWFOUNDLAND AND LABRADOR HYDRO**
**ISOLATED RURAL SYSTEMS**
**PROPOSED INSTALLED GENERATING CAPACITY - END OF 2019 – kW**

| Plant Location | Individual Unit Sizes | | | | | | Firm Capacity | Installed Capacity |
|---|---|---|---|---|---|---|---|---|
| **Labrador** | | | | | | | | |
| Black Tickle | 300 | 455 | 250 | | | | 550 | 1,005 |
| Cartwright | 450 | 720 | 450 | 600 | | | 1,500 | 2,220 |
| Charlottetown | 300 | 725 | 725 | 500 | 910 | | 2,075 | 3,160 |
| Hopedale | 545 | 569 | 475 | 925 | | | 1,589 | 2,514 |
| L'Anse Au Loup[1] | 1,500[2] | 1,825 | 800 | 1,100 | 1,000 | 1,825 | 6,950 | 8,050 |
| Makkovik | 565[2] | 565 | 635 | | | | 1,130 | 1,765 |
| Mary's Harbour | 545 | 545 | 820 | 725 | | | 1,815 | 2,635 |
| Nain | 865 | 865 | 1,275 | 750 | | | 2,480 | 3,755 |
| Norman Bay | 40 | 50 | 70 | | | | 90 | 160 |
| Paradise River | 50 | 48 | 50 | | | | 98 | 148 |
| Port Hope Simpson | 455 | 750[2] | 455 | 600 | | | 1,365 | 1,965 |
| Postville | 252 | 365 | 275 | | | | 527 | 892 |
| Rigolet | 320 | 455 | 545 | | | | 775 | 1,320 |
| St. Lewis | 365 | 455 | 200 | | | | 565 | 1,020 |
| Williams Harbour | 210 | 80 | 90 | | | | 170 | 380 |
| **SUBTOTAL** | | | | | | | **21,679** | **30,989** |
| **Island** | | | | | | | | |
| Francois | 275 | 150 | 210 | | | | 360 | 635 |
| Grey River | 136 | 136 | 250 | | | | 272 | 522 |
| Little Bay Islands | 450 | 275 | 205 | | | | 480 | 930 |
| McCallum | 136 | 210 | 100 | | | | 236 | 446 |
| Ramea[3] | 925 | 925 | 925 | | | | 1,850 | 2,775 |
| St. Brendan's | 277 | 210 | 225 | | | | 435 | 712 |
| **SUBTOTAL** | | | | | | | **3,633** | **6,020** |
| **TOTAL INSTALLED CAPACITY** | | | | | | | | **37,009** |

[1] Excludes Hydro Quebec interconnected capacity at 4,000 kW.
[2] Includes proposed capacity increases to December 31, 2019
[3] Excludes power purchase capacity of 390 kW from Frontier Power and Nalcor Wind Hydrogen capacity.

**Exhibit 2 - Organizational Responsibility**

# Organizational Responsibility

## July 2017

**Table of Contents**

1.0 Overview ..... 1
2.0 Executive Leadership ..... 1
3.0 Production ..... 2
3.1 Thermal Generation ..... 2
3.2 Hydraulic Generation ..... 2
3.3 Resource and Production Planning ..... 2
4.0 Transmission and Distribution and NLSO ..... 2
4.1 Transmission and Rural Operations ..... 3
4.2 Rural Planning ..... 3
4.3 Newfoundland and Labrador System Operator ..... 3
5.0 Engineering Services ..... 5
5.1 Engineering ..... 5
5.2 Information and Operations Technology ..... 5
5.3 Asset Management and Reliability ..... 5
6.0 Corporate Services and Regulatory Affairs ..... 6
6.1 Regulatory Affairs ..... 6
6.2 Customer Service ..... 6
6.3 Energy Efficiency ..... 6
6.4 Safety and Health ..... 6
6.5 Environment ..... 6
6.6 Human Resources and Labour Relations ..... 7
6.7 Communications ..... 7
7.0 Corporate Secretary and General Counsel ..... 7
8.0 Financial Services ..... 7
8.1 Finance ..... 7
8.2 Supply Chain Management and Administration ..... 8
8.3 Internal Audit ..... 8

## List of Schedules

Schedule I – Organizational Charts

## 1.0 Overview

Newfoundland and Labrador Hydro is a Crown corporation continued and existing under the *Hydro Corporation Act, 2007.*[1] Hydro's mandate is to provide safe, reliable, and least cost electricity to customers in Newfoundland and Labrador. This report is intended to provide an overview of Hydro's operations and organizational structure.

Hydro's organizational structure was updated in 2016. There are seven divisions within Hydro: Executive Leadership, Production, Transmission and Distribution and NLSO, Engineering Services, Financial Services, Corporate Services and Regulatory Affairs, and Corporate Secretary and General Counsel.

Schedule I to this exhibit provides the organizational structure of Hydro.

## 2.0 Executive Leadership

Hydro's Executive Leadership division consists of the Senior Leadership team as depicted in Schedule I, page 1 of 33. The Executive team are accountable for leading and managing all functions associated with delivering utility service to fulfill Hydro's core mandate to provide safe, reliable, and least cost electricity to customers in the Province. Each of the Vice-Presidents lead their respective divisions.

Hydro has also created a new temporary position, Manager, Interconnection & Integration, reporting directly to the President to manage Hydro's activities associated with the interconnection to the North American grid. This position is responsible for evaluating opportunities and risks associated with interconnection, and managing Hydro's key activities for effective integration.

[1] *Hydro Corporation Act, 2007*, SNL 2007, c. H-17, copy available at http://www.assembly.nl.ca/legislation/sr/statutes/h17.htm
Although Hydro has its own enabling legislation, it is also a subsidiary of the Crown corporation Nalcor Energy (Nalcor)which was created in 2007 to manage the province's energy resources by the *Energy Corporation Act*, SNL 2007, c. E-11.01, copy available at http://www.assembly.nl.ca/Legislation/sr/statutes/e11-01.htm.

## 3.0 Production

The Production division, as depicted in Schedule I, pages 2 through 8 of 33, is responsible for all aspects of power generation and supply. Hydro's various sources of thermal and hydro generation collectively represent a total installed generation capacity of 1763 MW and are geographically dispersed across the island and in Labrador. There are three departments within Production.

### 3.1 Thermal Generation

The Thermal Generation department is responsible for the operation and maintenance of the Holyrood Thermal Generating Station and Hydro's Gas Turbines, as well the long term planning for Hydro's remote diesels and related facilities.

### 3.2 Hydraulic Generation

The Hydraulic Generation department is responsible for the operation and maintenance of Hydro's nine hydroelectric generating stations and related facilities.[2]

### 3.3 Resource and Production Planning

The Resource and Production Planning department is responsible for generation planning and water management.

## 4.0 Transmission and Distribution and NLSO

This division includes transmission, distribution, and the Newfoundland and Labrador System Operator (NLSO) as depicted in Schedule I, pages 9 through 18 of 33. This division is responsible for: operating and maintaining Hydro's transmission and terminal station infrastructure for the interconnected system; operating and maintaining the distribution and isolated diesel systems;

[2] Hydraulic Generation is also responsible for the operation of the Exploits assets owned by the Government of Newfoundland and Labrador. Costs associated with the operations are recovered from the asset owner and do not impact Hydro customers.

rural planning; operating the electrical power system, including generation dispatch; and directing the operations of the transmission facilities to meet anticipated load.

There are three departments within Transmission and Distribution and NLSO.

## 4.1 Transmission and Rural Operations

Transmission and Rural Operations (TRO) is responsible for the maintenance of Hydro's transmission systems and the operation and maintenance of the rural distribution and isolated diesel assets. TRO has two sections: 1) Northern and Labrador to focus on the assets and requirements in Northern part of the Island and in Labrador; and 2) Western and Eastern to focus on assets in Western, Central, and Eastern Newfoundland, including the Avalon Peninsula.

## 4.2 Rural Planning

Rural Planning is responsible for planning the distribution and rural generation facilities located on the Labrador Interconnected System, the Isolated Rural systems, and Island Interconnected System. This includes recommending system modifications or expansion, completing system studies, and preparing operational and long-term planning load forecasts for the various rural power systems, as well as load forecasts for the Labrador Interconnected and Island Interconnected Systems. These are then used to assess and ensure facilities are available to serve customer requirements.

## 4.3 Newfoundland and Labrador System Operator

The creation of the Newfoundland and Labrador System Operator (NLSO) is an important step in the integration of the Muskrat Falls assets into the provincial electrical system and the Island's interconnection with the North American electricity grid. Industry recognized standards, such as those developed by the Federal Energy Regulatory Commission

(FERC),[3] recommend that functional separation exist between power production and the NLSO. FERC imposes additional requirements in its Standards of Conduct regulations that govern that employees of the NLSO function independently from Nalcor Energy Marketing employees.[4]

The NLSO will reside in Hydro but will be functionally separate and will act as the independent system operator for the transmission system in the Province. It will operate the facilities owned by Hydro and Nalcor along with interconnections to Emera's Maritime Link assets on the island.

Hydro has structured the NLSO into three main areas: Transmission Planning, System Operations, and Reliability and Commercial Management:

- Transmission Planning – The transmission planning group is responsible for the safe, efficient, reliable, and environmentally responsible planning of the provincial interconnected transmission system.
- System Operations – The System Operations group manages the Newfoundland and Labrador power system and coordinates the supply of and demand for electricity in accordance with reliability standards in effect in the province.
- Reliability and Commercial Management – The NLSO is responsible for establishing the reliability framework for operating the bulk electrical system.[5] The NLSO is also responsible for offering open and non-discriminatory access to the Newfoundland and Labrador interconnected transmission system to all transmission customers, including Nalcor affiliates and non-affiliated third parties.

[3] The Federal Energy Regulatory Commission (FERC) is an independent agency, based in Washington, D.C., which regulates the inter-state transmission of electricity, natural gas, and oil. In the United States, and in neighboring Canadian jurisdictions, wholesale sales of electricity are typically governed by FERC's Open Access Transmission Tariff, which sets out standards and other requirements governing market access and system reciprocity.

[4] The purpose of this requirement is to ensure that there is no collaboration or exchange of non-public transmission information between affiliated business units which could impair non-discriminatory, open system access within the wider electricity market.

[5] The bulk electrical system is an interconnected group of electric transmission lines and associated equipment for moving or transferring electric energy in bulk between points of supply and point for delivery over the distribution system lines to consumers, or is delivered to other electric systems.

## 5.0 Engineering Services

Engineering Services, as depicted in Schedule I, pages 19 through 27 of 33, is responsible for Hydro's engineering activities, project execution, and asset oversight. There are three main areas in Engineering Services: Engineering; Asset Management and Reliability; and Information and Operations Technology.

### 5.1 Engineering

The Engineering department includes the following functions: Project Execution; Asset Management and Reliability; Civil, Transmission, and Distribution Engineering; Electrical Engineering; Mechanical Engineering; Protection, Controls, and Communication Engineering; and Engineering Support Services. Some of the functions of engineering include:

- Managing capital and operating projects;
- Managing engineering design standards;
- Providing engineering support services including legal surveys, property acquisitions, drafting services; and
- Providing engineering expertise and project management services.

### 5.2 Information and Operations Technology

The Information and Operations Technology Department provides information and operating technology solutions related to the Energy Management System (EMS) and Network Services. It also manages the delivery of Information Systems services from Nalcor to Hydro.

### 5.3 Asset Management and Reliability

The Asset Management and Reliability Department is responsible for establishing and maintaining asset management framework and procedures and coordinating corporate capital budget development.

## 6.0 Corporate Services and Regulatory Affairs

This division consists of the following seven departments: Regulatory Affairs; Customer Service; Energy Efficiency; Safety and Health; Environment; Human Resources and Labour Relations; and Communications. Please refer to Schedule I, pages 28 through 31 of 33.

### 6.1 Regulatory Affairs

Regulatory Affairs is responsible for all aspects of utility regulation, rate design, and policy. Regulatory Affairs is also responsible for monitoring and managing the Company's relationship with the Board of Commissioners of Public Utilities and ensuring appropriate processes and interfaces between regulatory, operations, and other support teams within Hydro.

### 6.2 Customer Service

The Customer Service department is Hydro's primary interface with customers. This department is responsible for communicating with customers regarding account enquiries, service requests, outage reporting, and other matters.

### 6.3 Energy Efficiency

This department is responsible for the delivery of Hydro's energy efficiency and conservation programs.

### 6.4 Safety and Health

Safety and Health provides functional services and support, as well as strategic and policy leadership, to all areas of Hydro on matters related to safety and health. It also manages the delivery of safety and health services from Nalcor.

### 6.5 Environment

The Environment department provides environmental services and support to all areas of Hydro, as well as general strategic and policy leadership in relation to environmental stewardship. It also manages the delivery of environment services from Nalcor.

### 6.6 Human Resources and Labour Relations

The Human Resources and Labour Relations department provides strategic leadership to Hydro in the areas of human resources management. This department administers and negotiates the Hydro's collective bargaining agreement and also manages the delivery of human resources services from Nalcor.

### 6.7 Communications

Hydro's Communications department is responsible for corporate communications, media relations, employee communications, community investment and community relations, and stakeholder engagement and consultation.

## 7.0 Corporate Secretary and General Counsel

Hydro's Corporate Secretary and General Counsel department provides core legal oversight to Hydro as well as Board Secretarial functions.

## 8.0 Financial Services

The Financial Services division, as depicted in Schedule I, pages 32 and 33 of 33, consists of three departments: Finance; Supply Chain Management and Administration; and Internal Audit.

### 8.1 Finance

The Finance department provides the following functions:

- Controller functions including financial reporting, regulatory finance, budgeting and forecasting, and general corporate accounting functions, including accounts payable;
- Treasury services of cash and debt management and tax services;
- Corporate planning to coordinate the corporate strategic planning and associated performance measurements and reporting;
- Enterprise risk management and control framework management; and
- Commercial services that manage the development of key commercial arrangements.

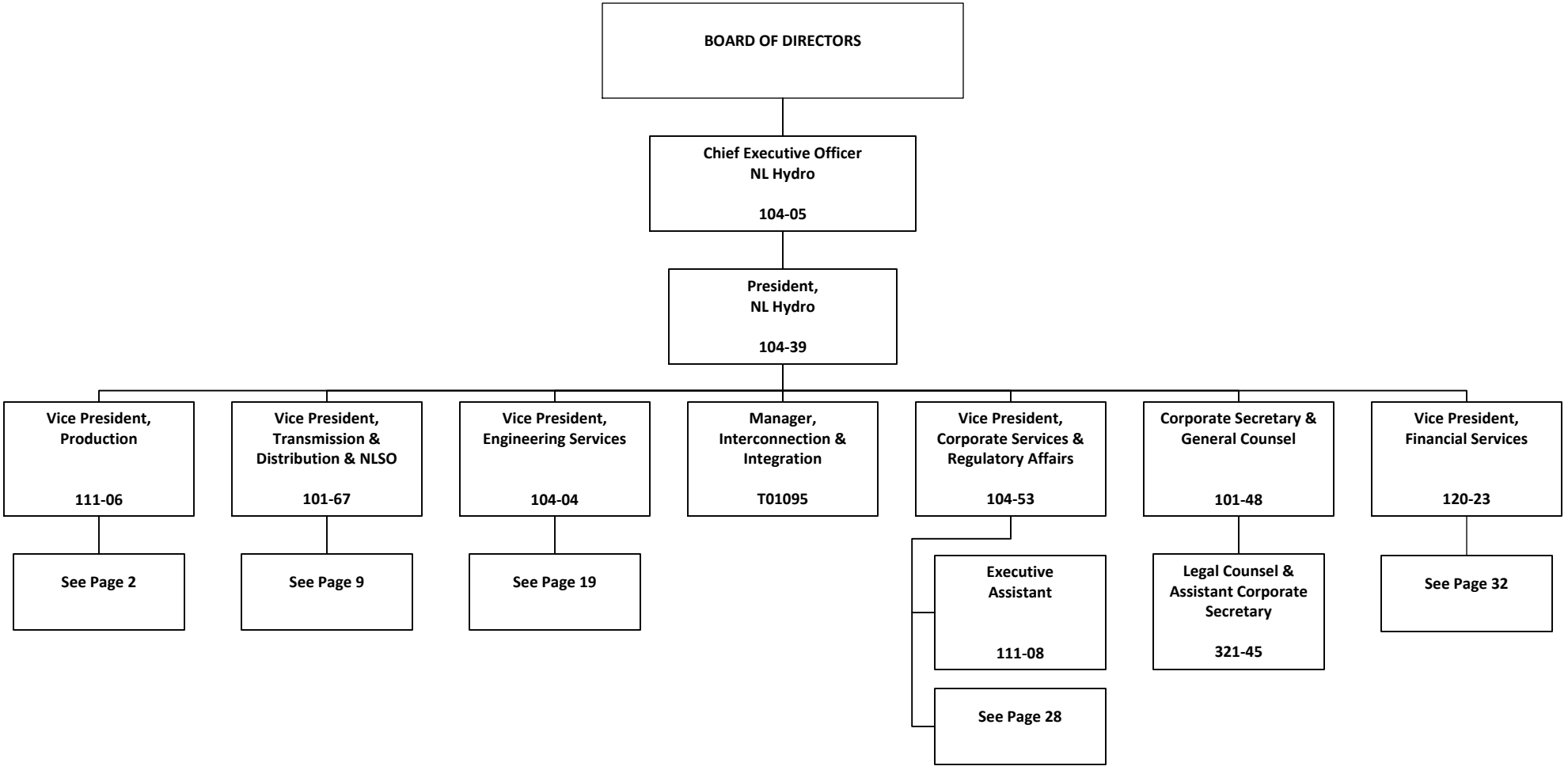
## 8.2 Supply Chain Management and Administration

The Supply Chain Management and Administration department manages procurement and contract management, materials management, and the management of Hydro Place.

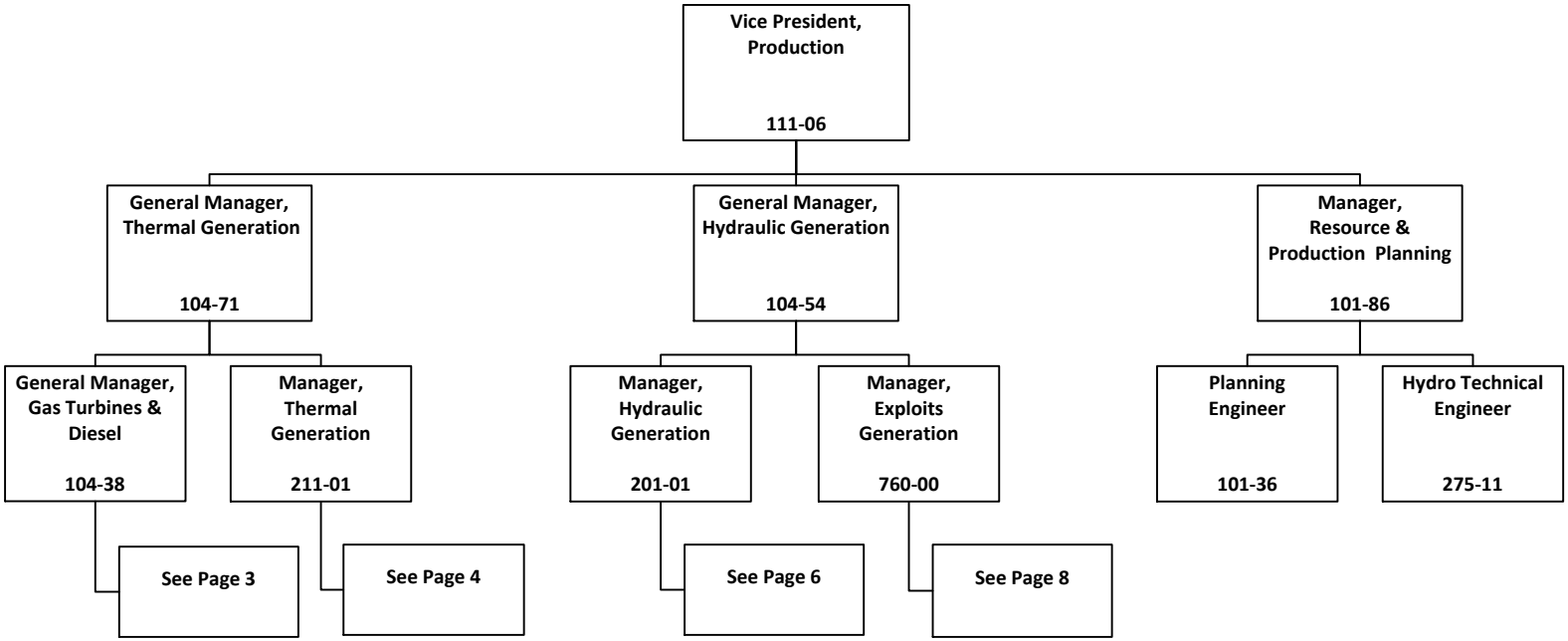
## 8.3 Internal Audit

The Internal Audit department conducts the internal audit function for Hydro. The Internal Audit department is accountable directly to the Hydro Board of Directors but reports administratively through the Finance division.

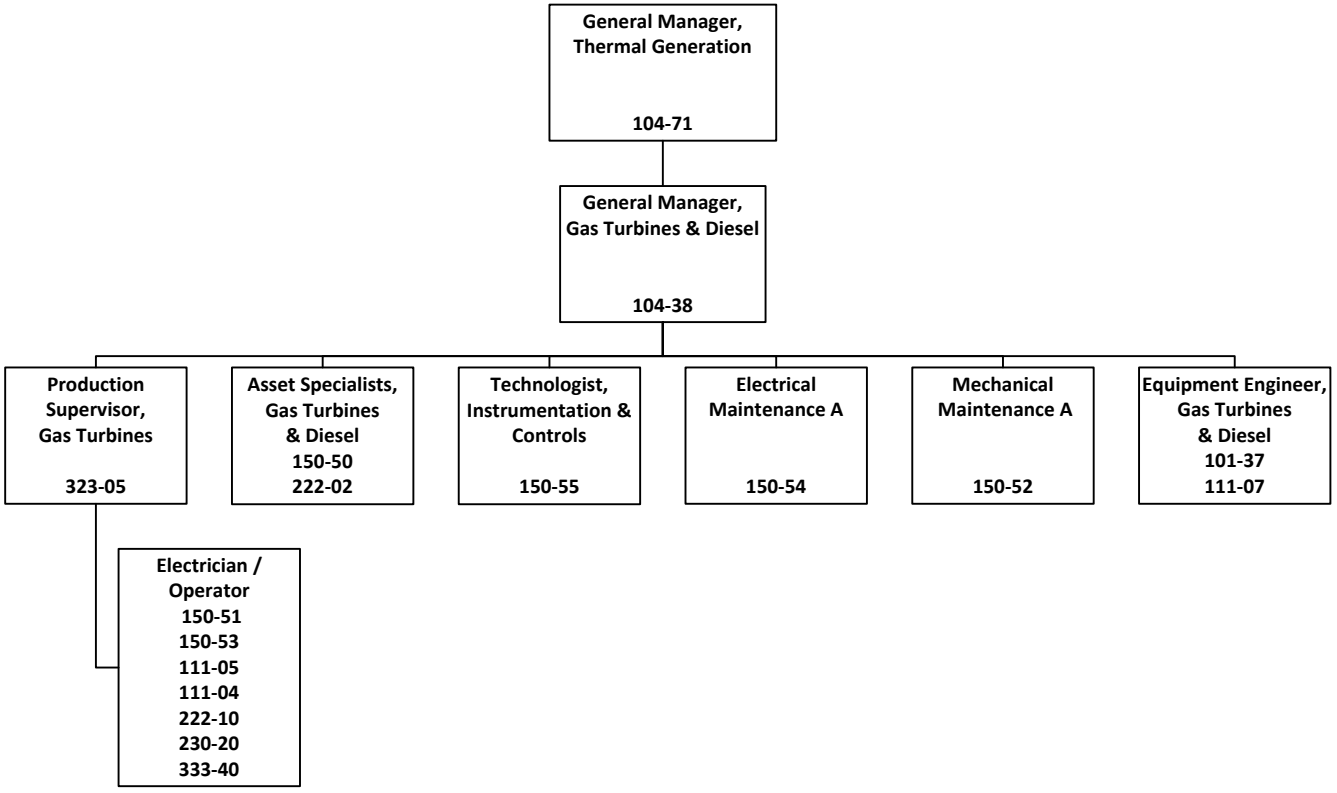
# Executive Leadership



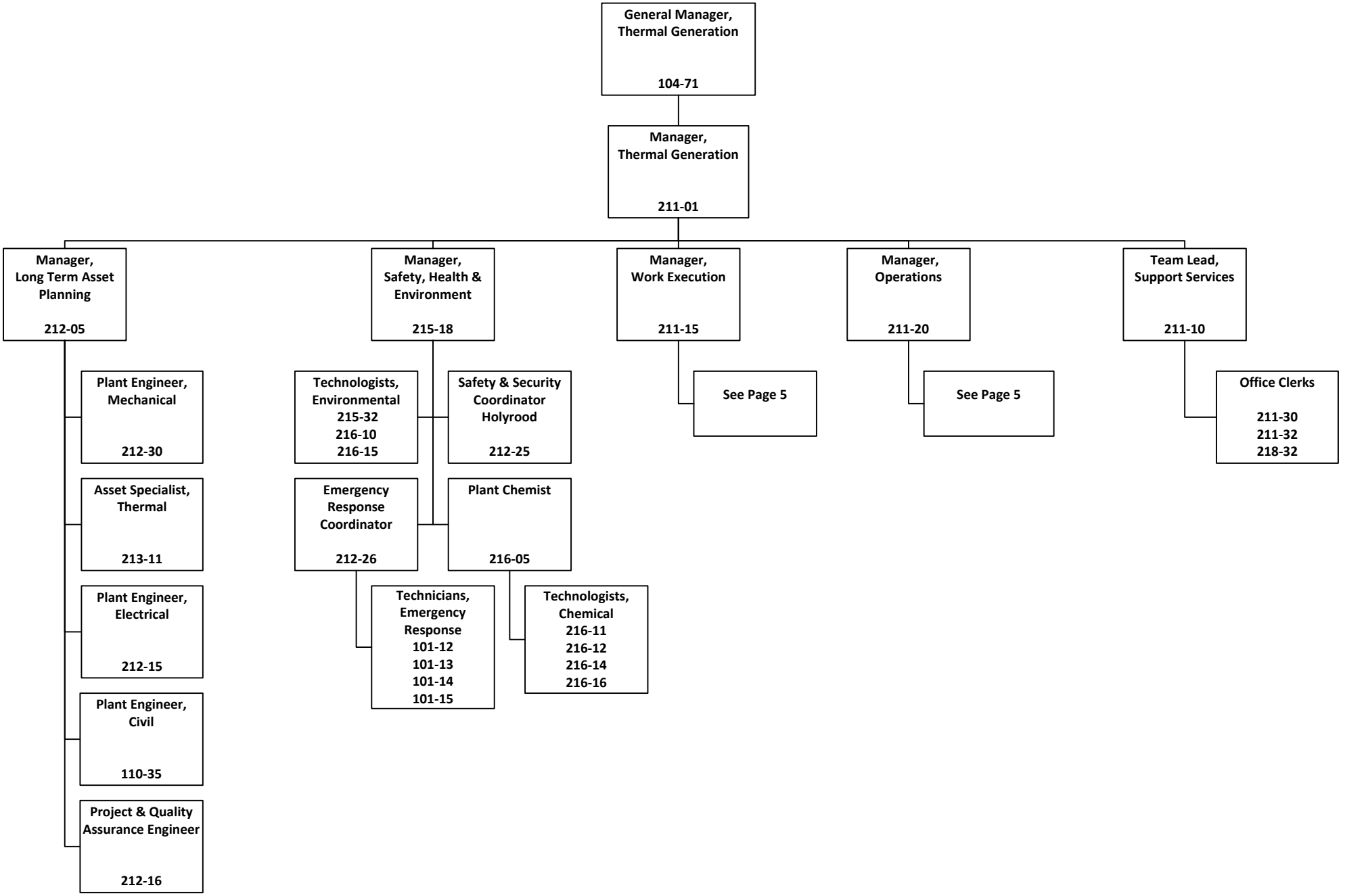
# Production


Vice President, Production
111-06
General Manager, Thermal Generation
104-71
General Manager, Hydraulic Generation
104-54
Manager, Resource & Production Planning
101-86
General Manager, Gas Turbines & Diesel
104-38
Manager, Thermal Generation
211-01
Manager, Hydraulic Generation
201-01
Manager, Exploits Generation
760-00
Planning Engineer
101-36
Hydro Technical Engineer
275-11
See Page 3
See Page 4
See Page 6
See Page 8

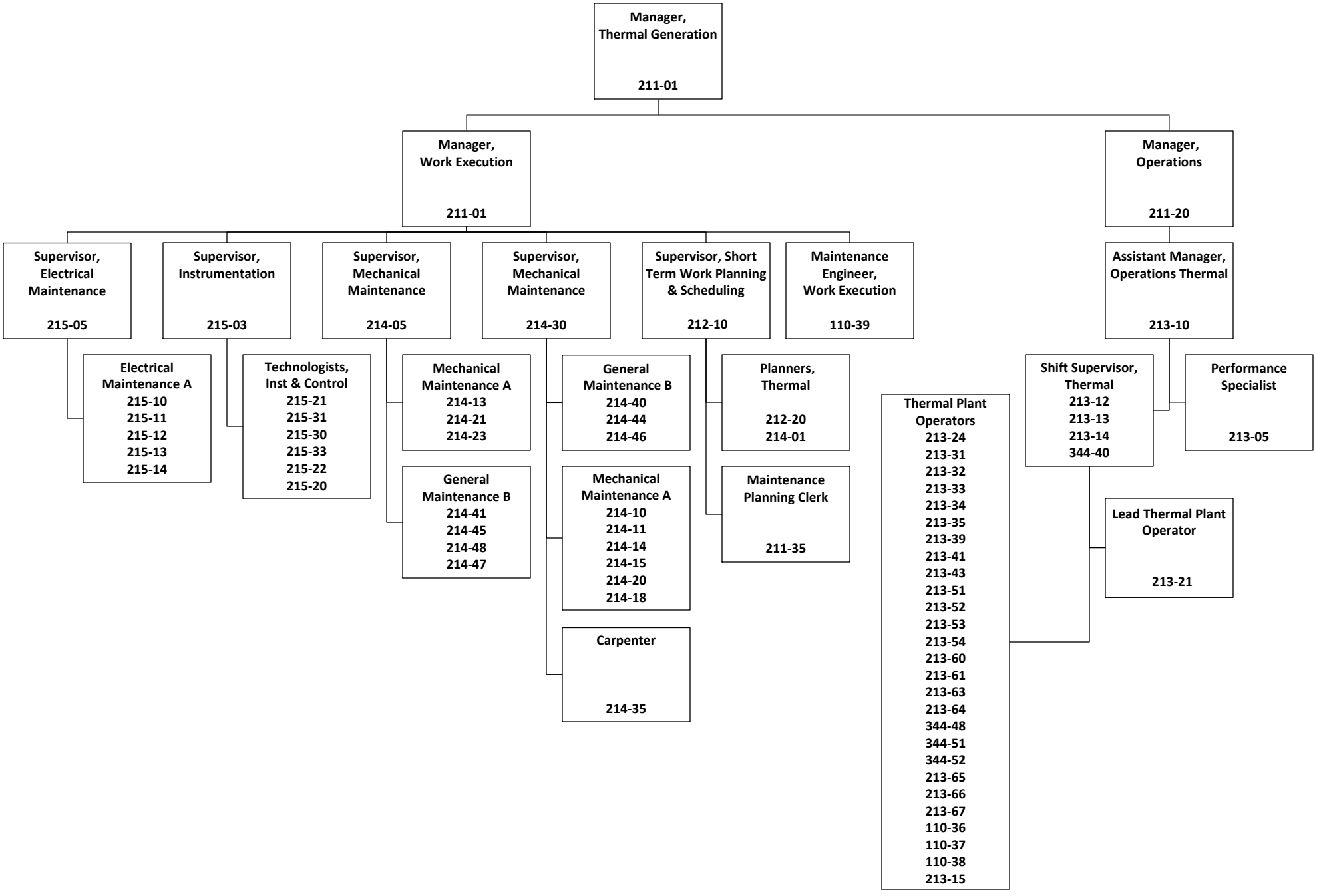
# Production
# Gas Turbines & Diesel



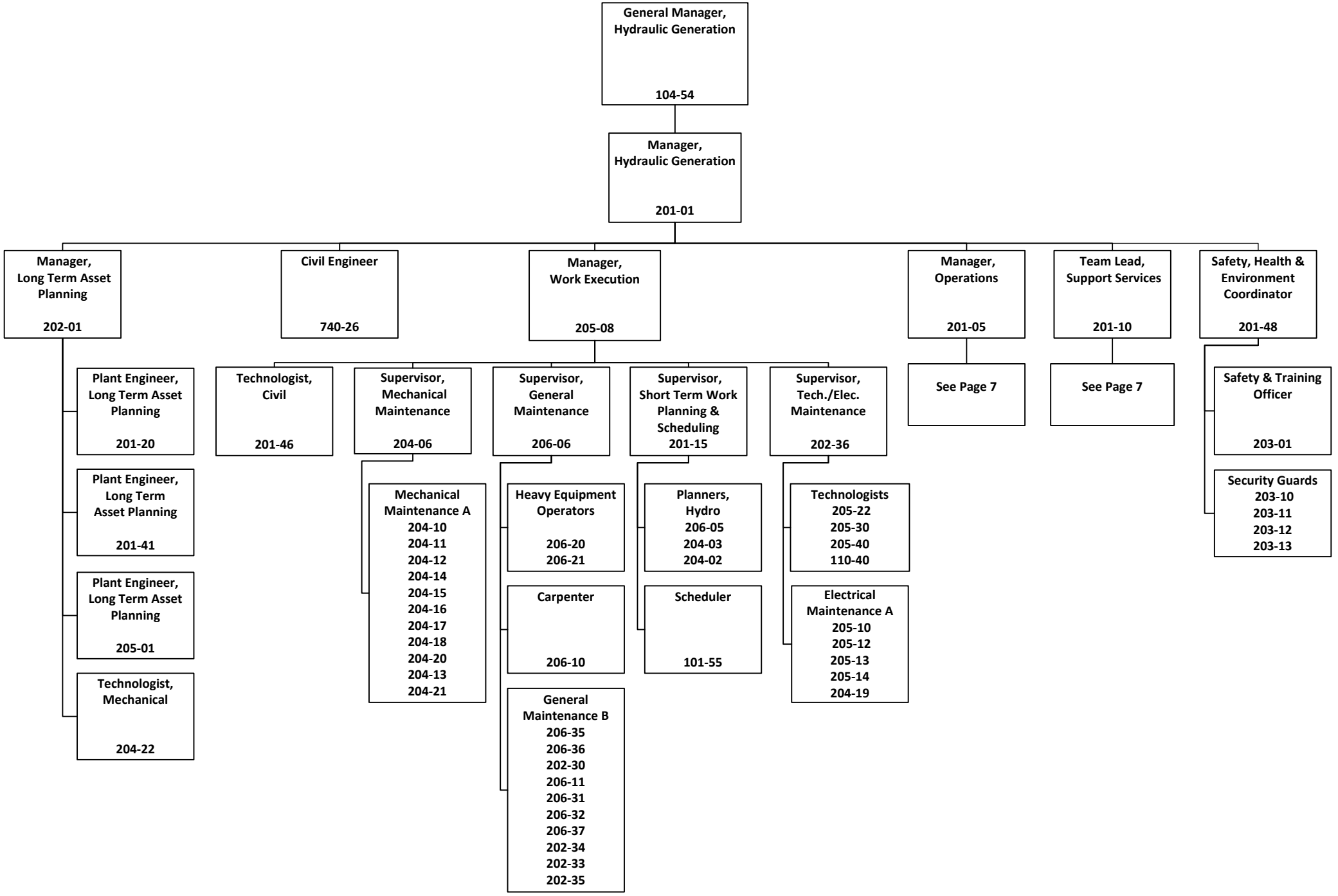
# Production
# Thermal Generation



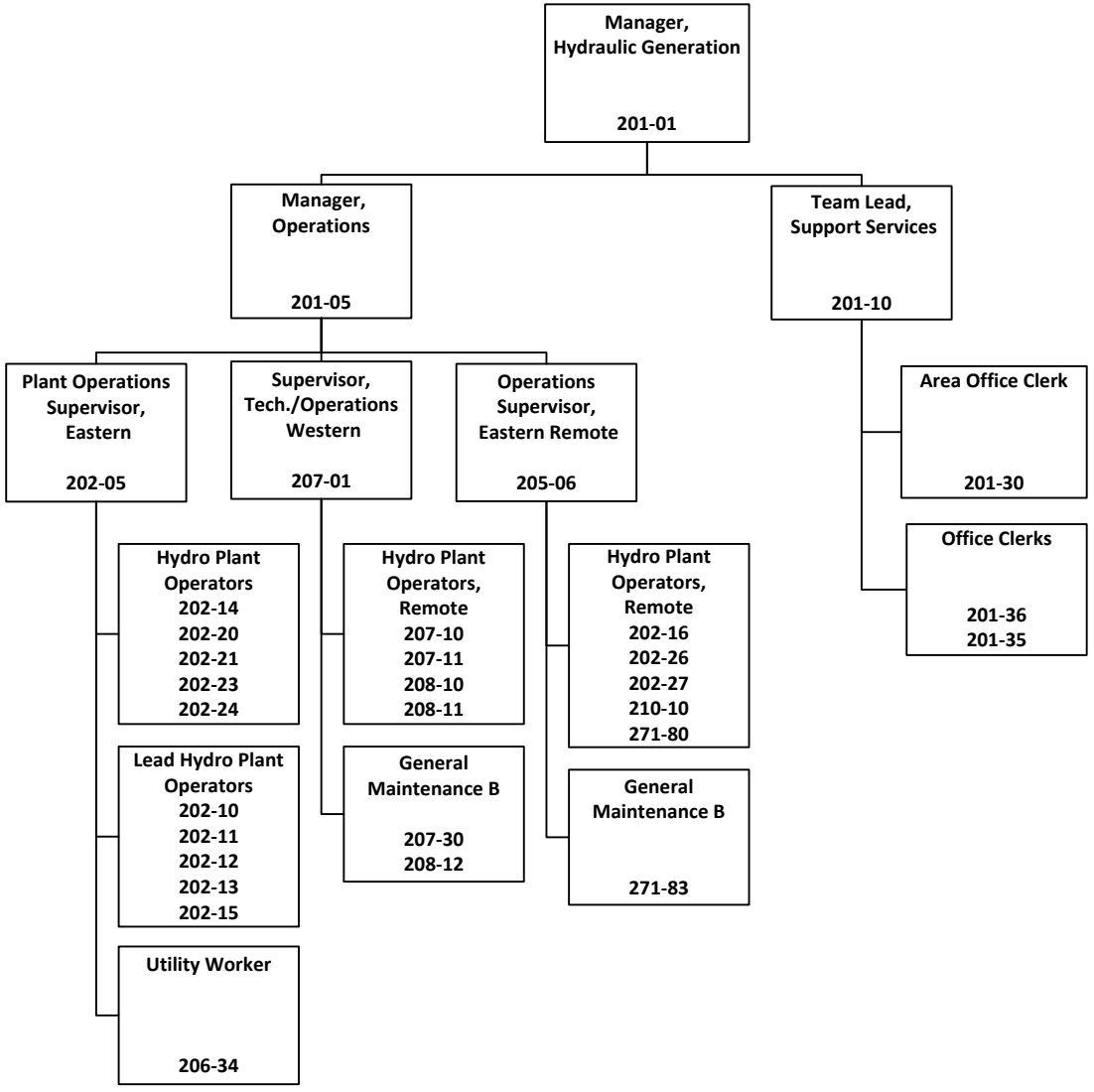
# Production
# Thermal Generation, Work Execution & Operations



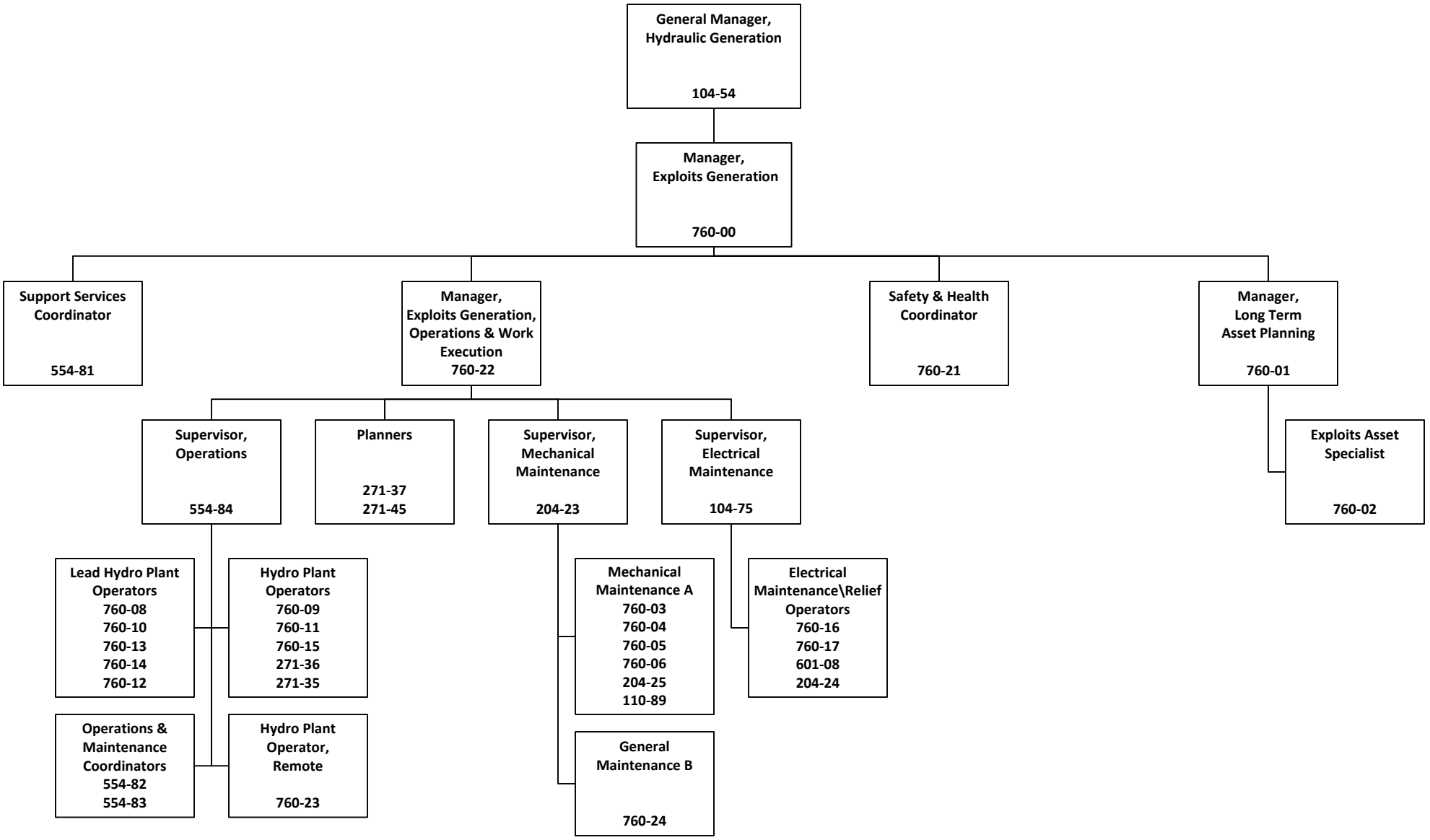
# Production
# Hydraulic Generation



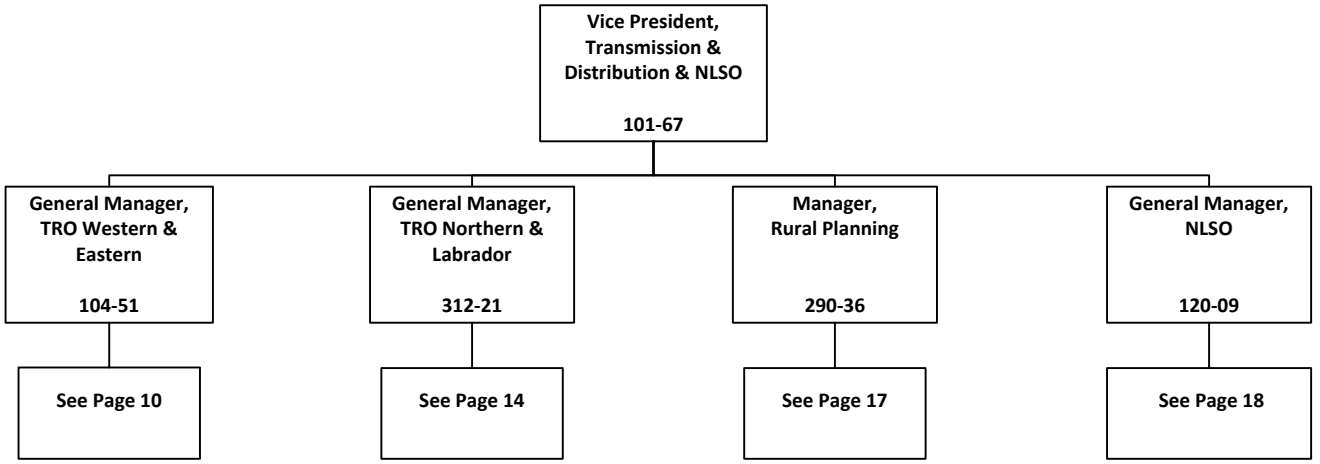
# Production
# Hydraulic Generation, Operations and Support Services



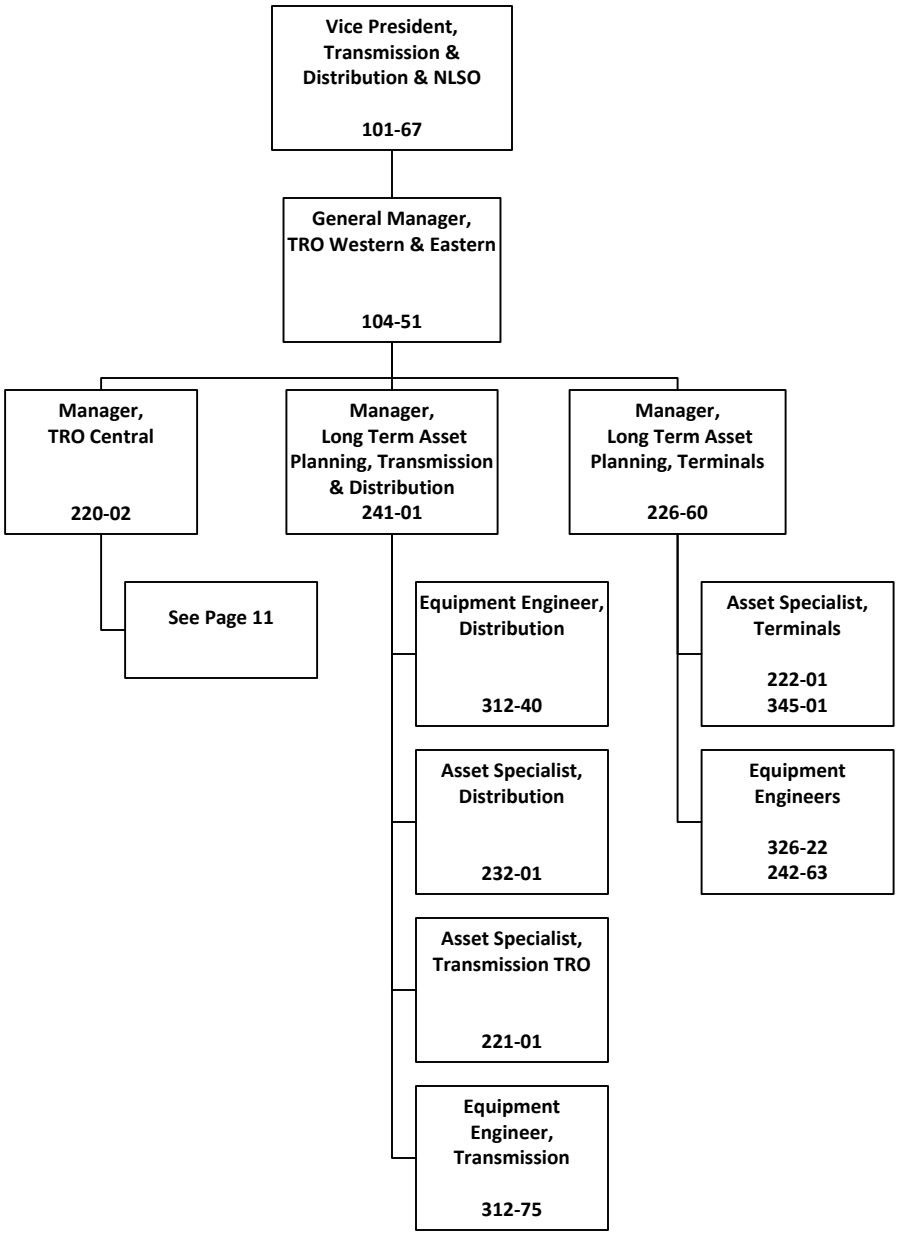
# Production
# Exploits Generation



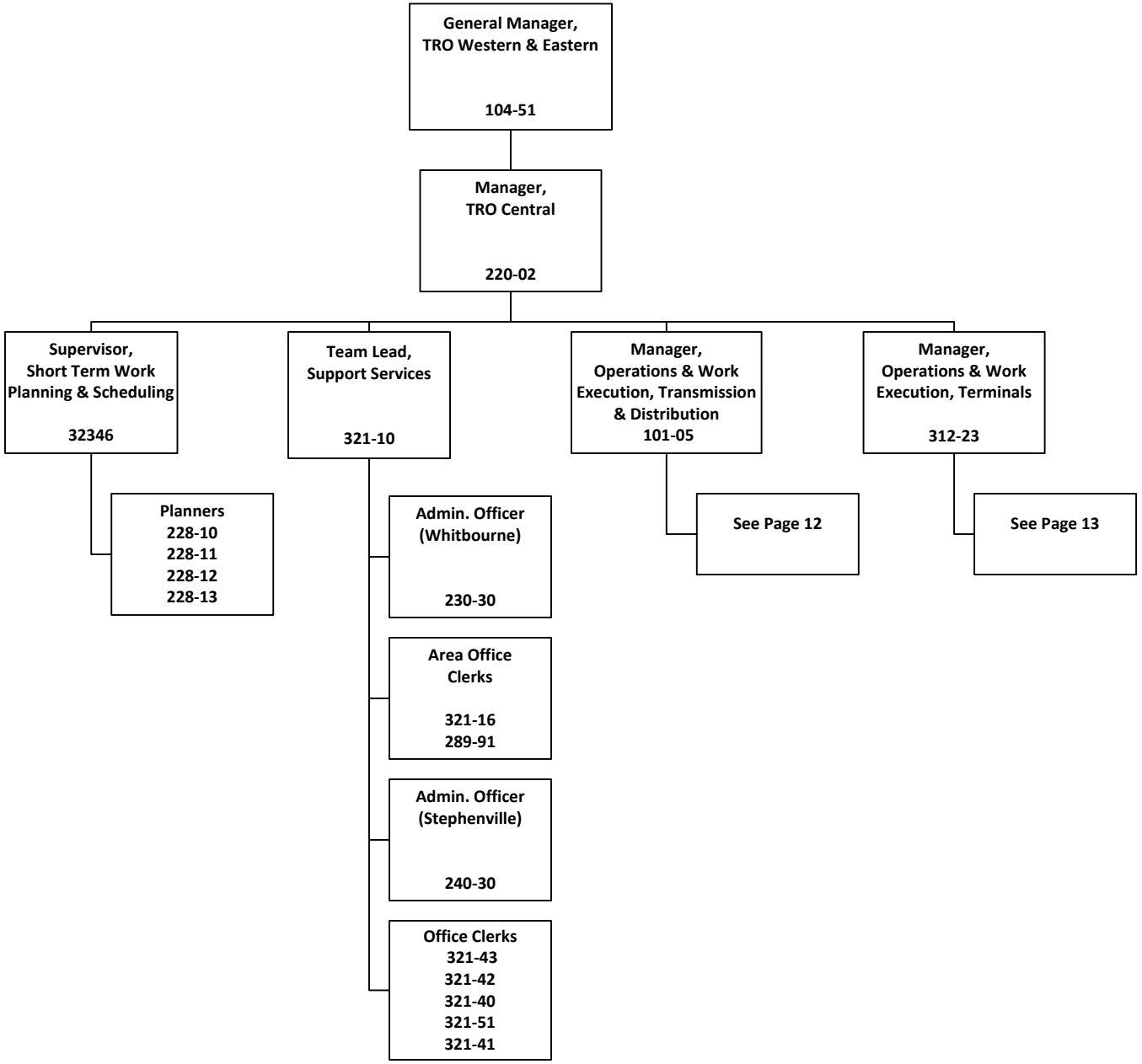
# Transmission & Distribution & NLSO



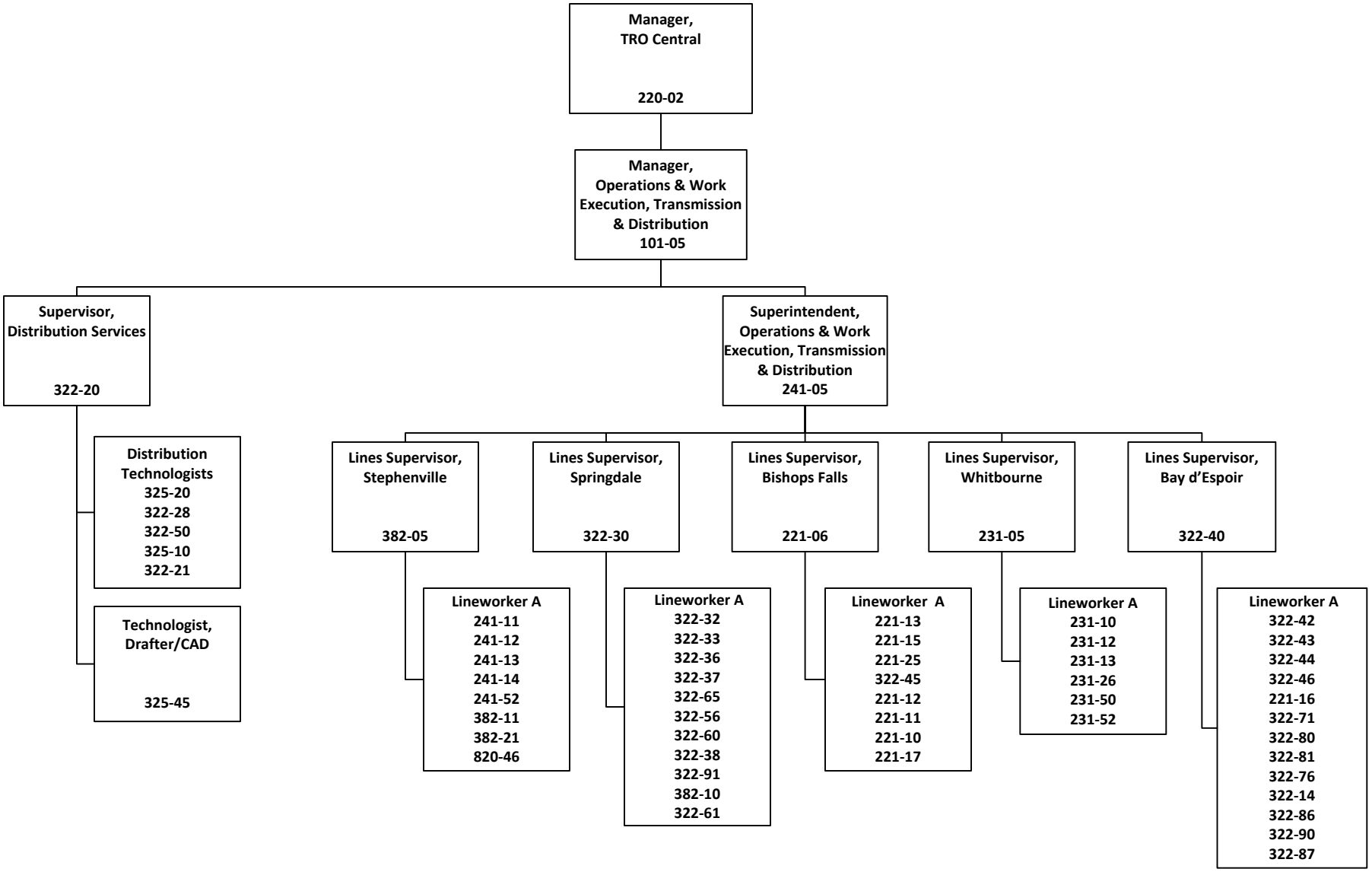
# Transmission & Distribution & NLSO
# TRO Western & Eastern



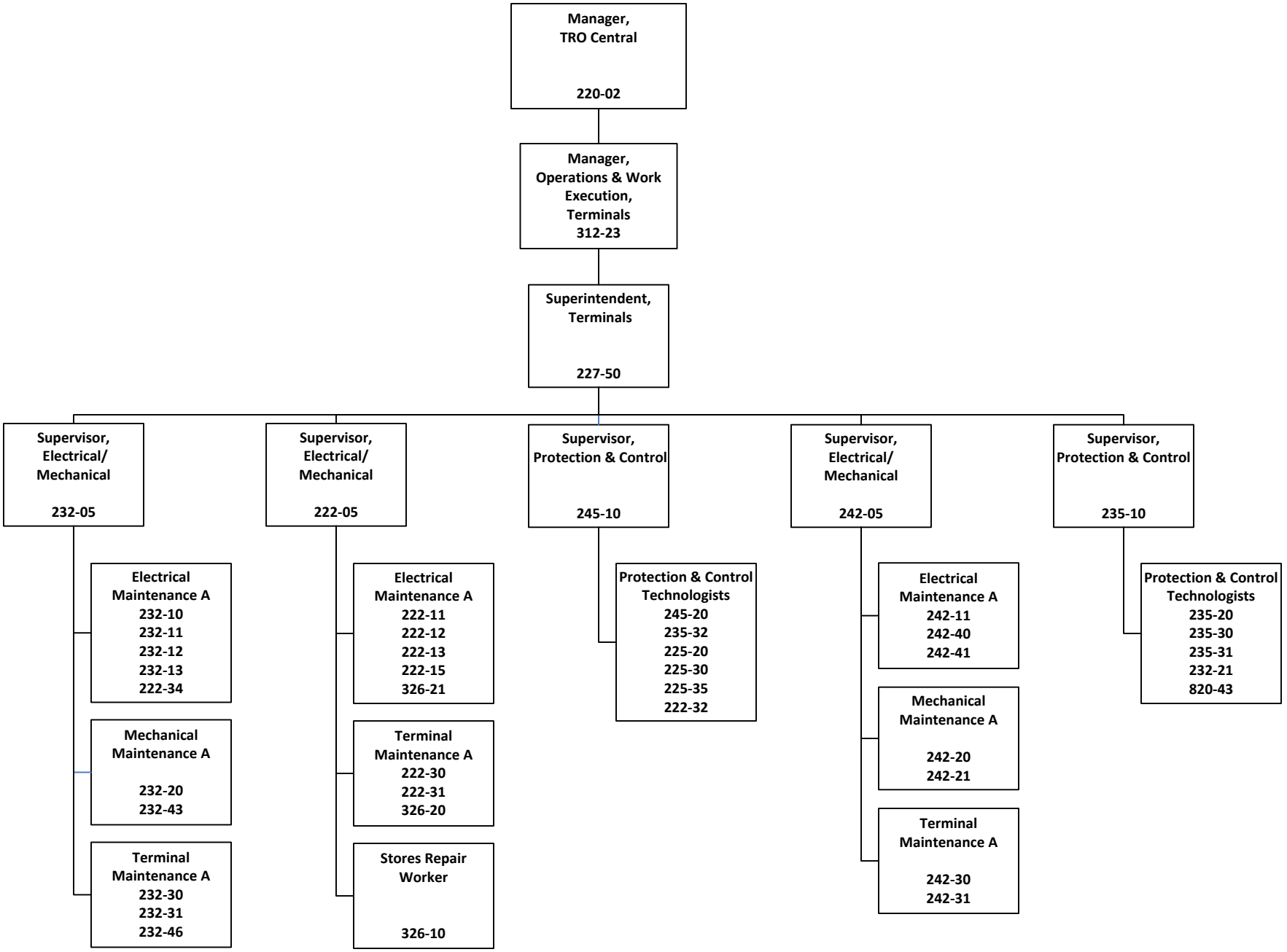
# Transmission & Distribution & NLSO
# TRO Western & Eastern



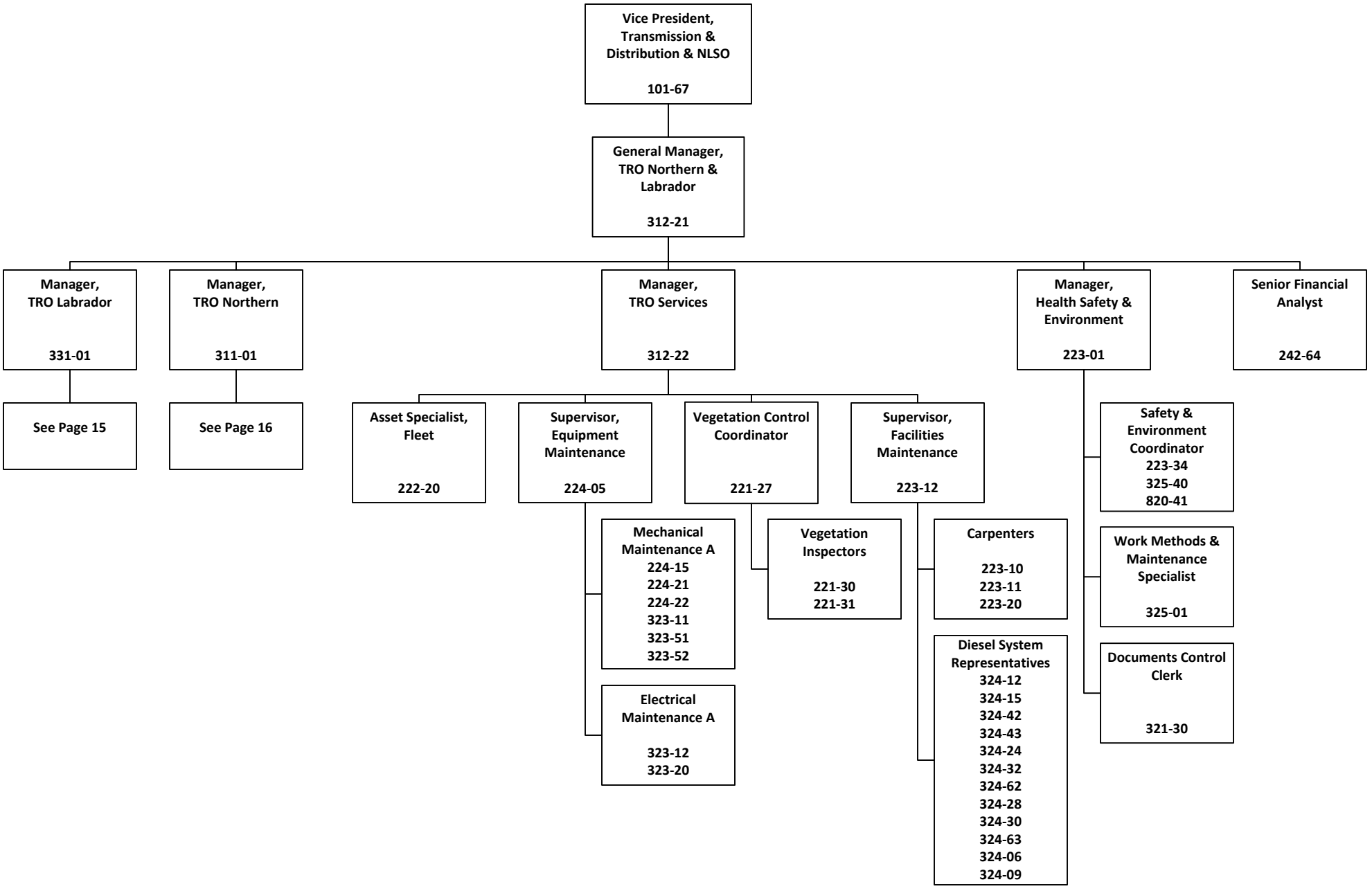
# Transmission & Distribution & NLSO
# TRO Western & Eastern
# Operations & Work Execution, Transmission & Distribution



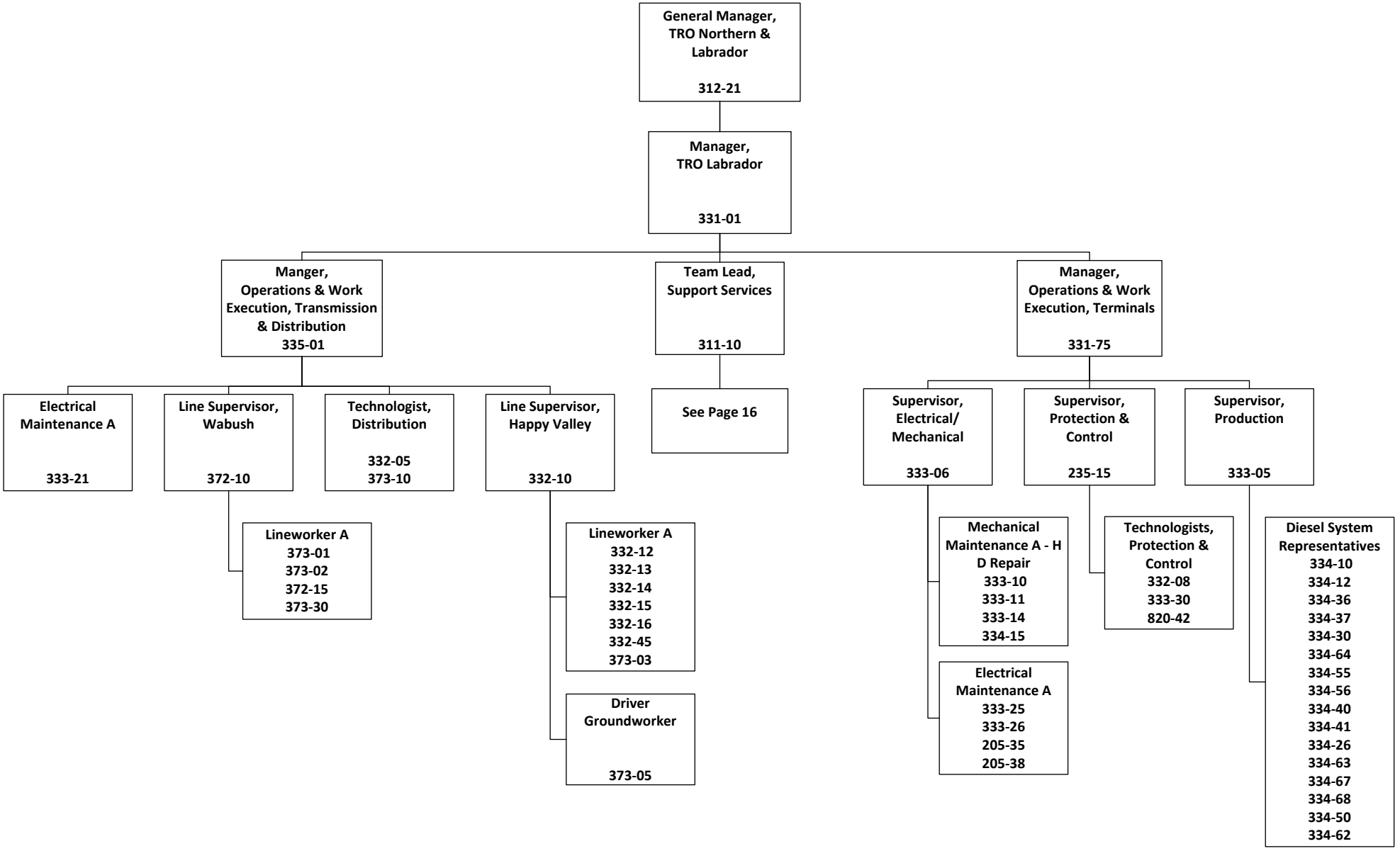
# Transmission & Distribution & NLSO
# TRO Western & Eastern
# Work Execution, Terminals



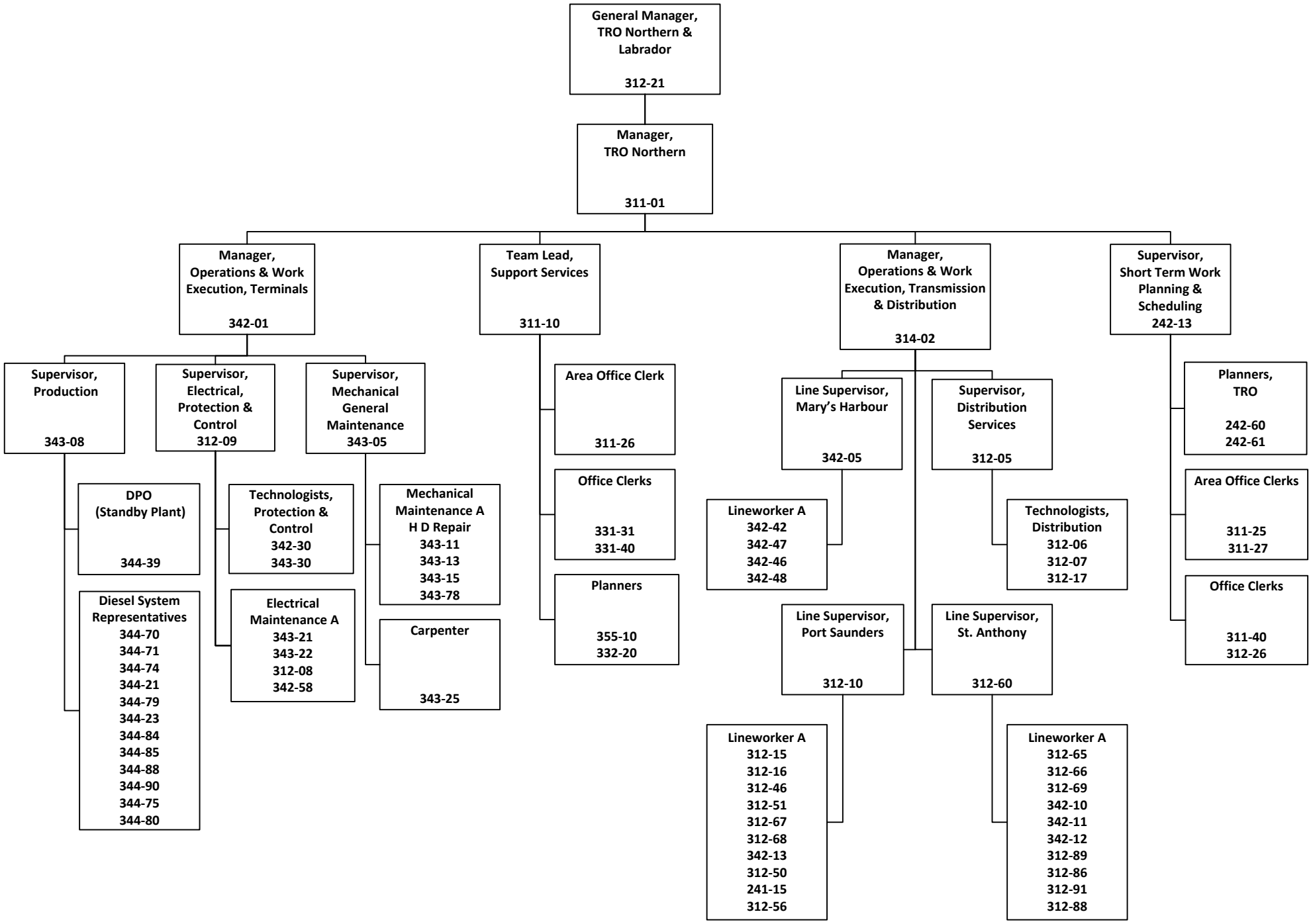
# Transmission & Distribution & NLSO
# TRO Northern & Labrador



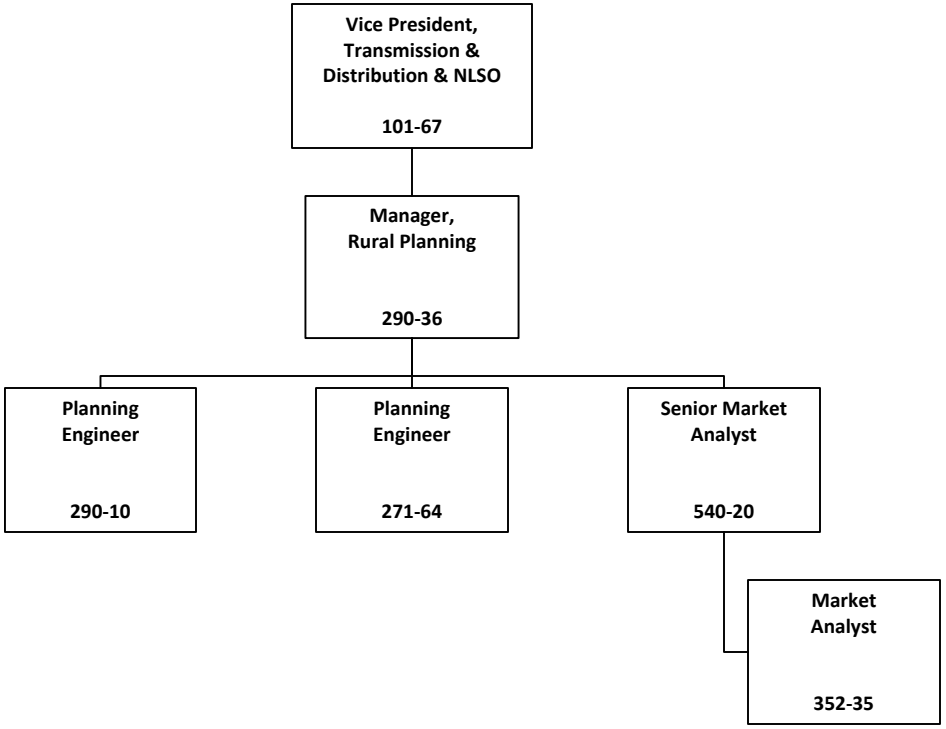
# Transmission & Distribution & NLSO
# TRO Northern & Labrador



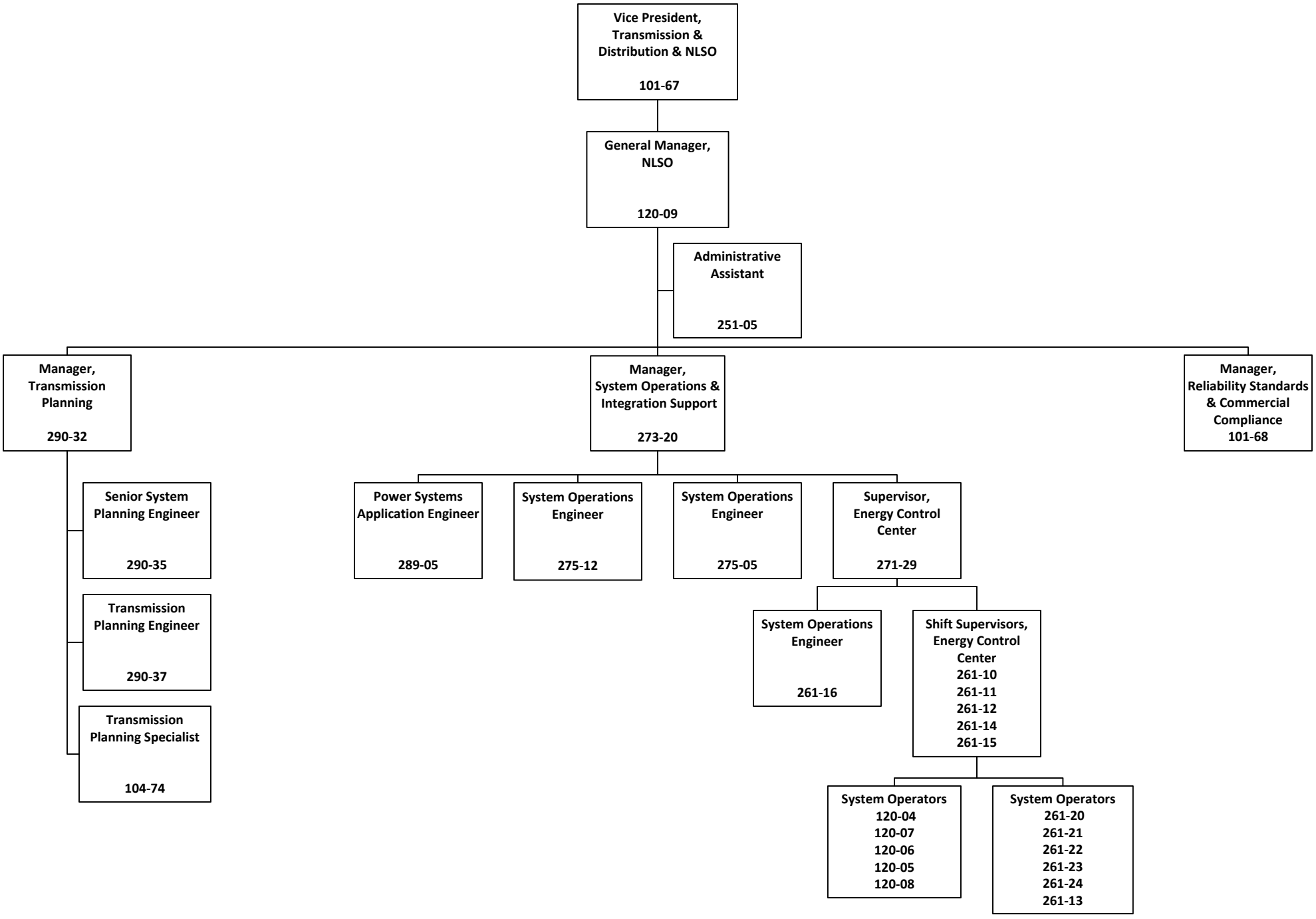
# Transmission & Distribution & NLSO
# TRO Northern & Labrador



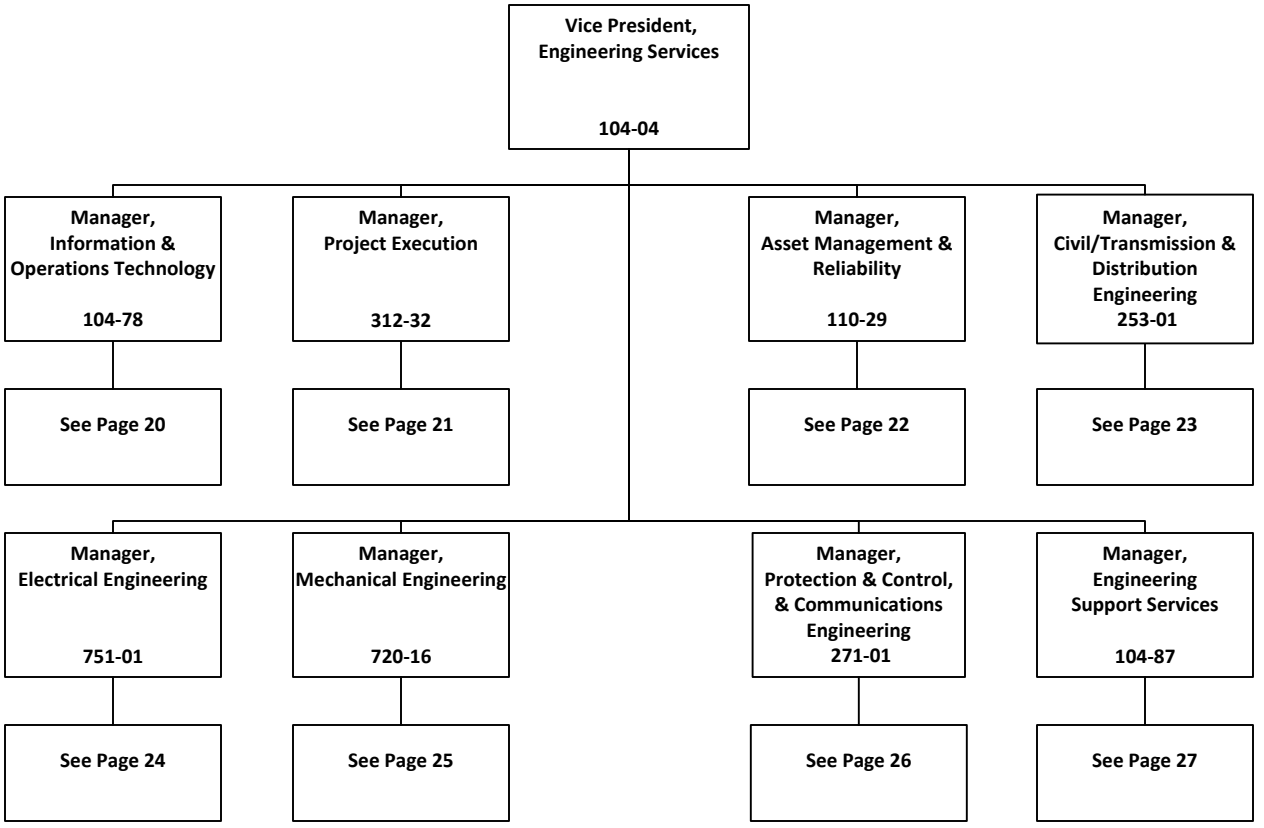
# Transmission & Distribution & NLSO
# Rural Planning



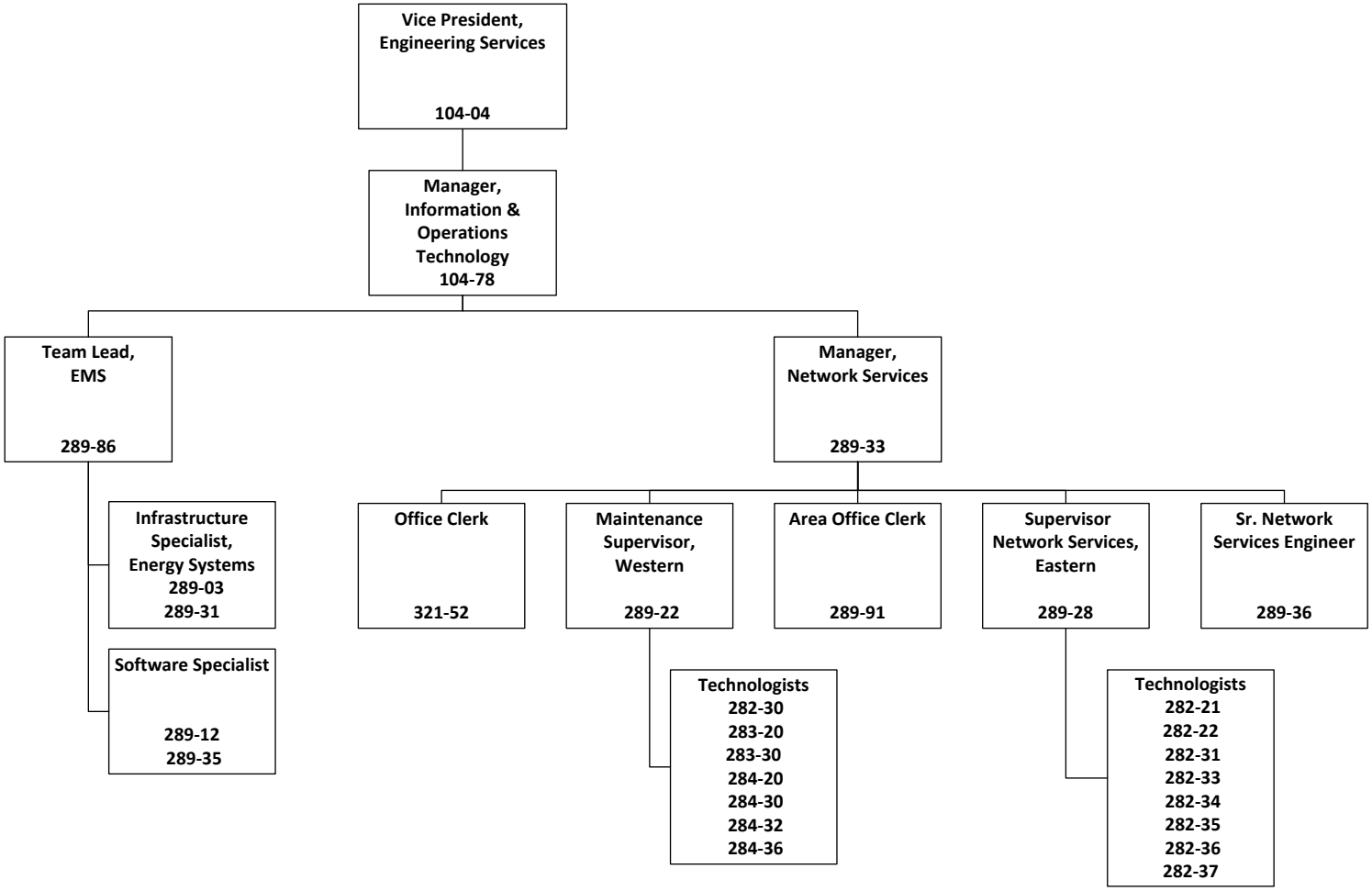
# Transmission & Distribution & NLSO
# Newfoundland & Labrador System Operator



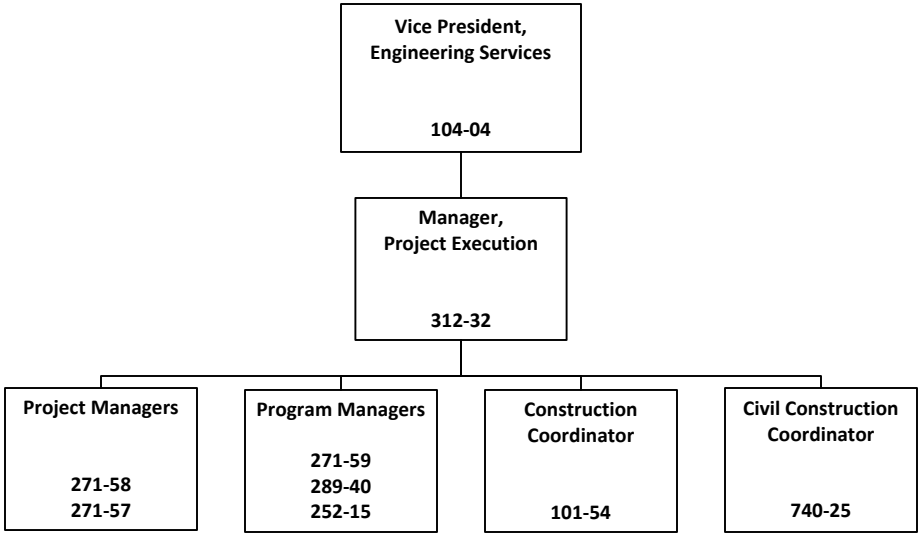
# Engineering Services



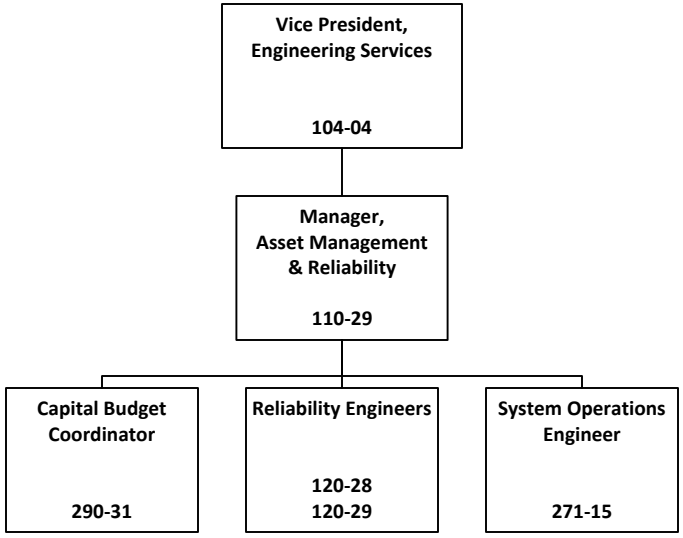
# Engineering Services
# Information & Operations Technology



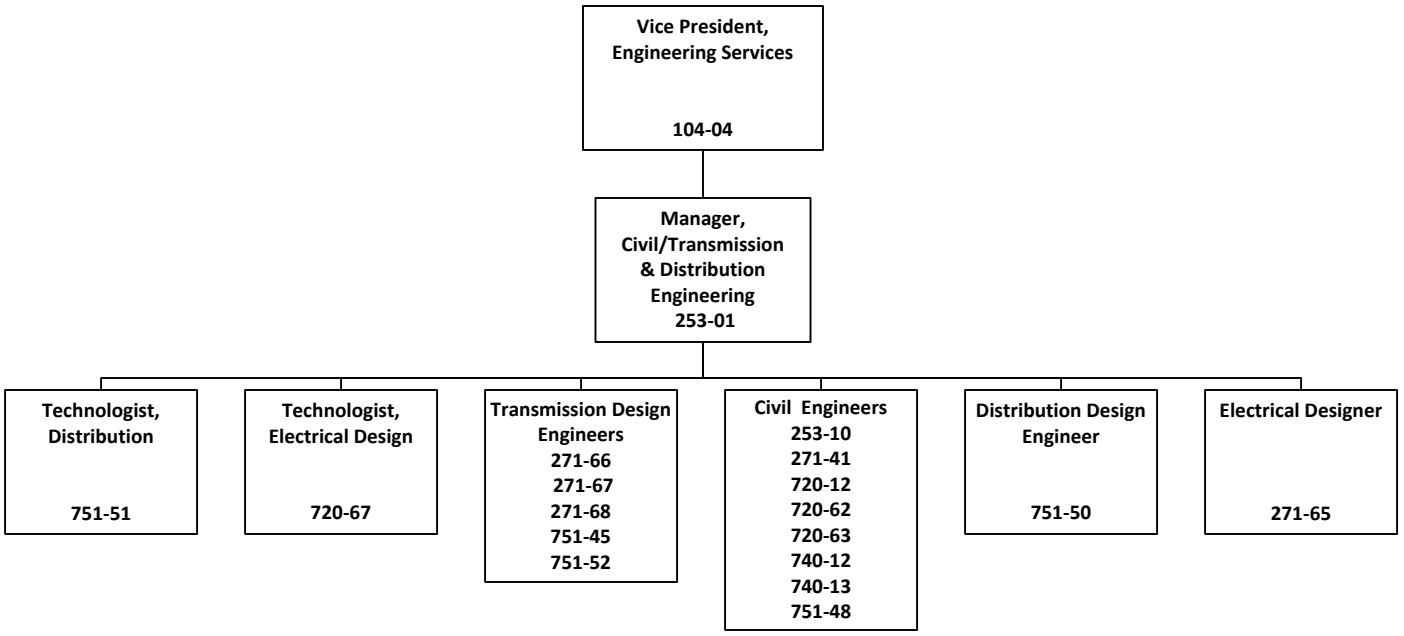
# Engineering Services
# Project Execution



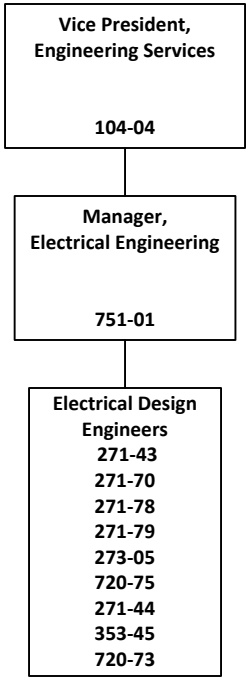
# Engineering Services
# Asset Management & Reliability



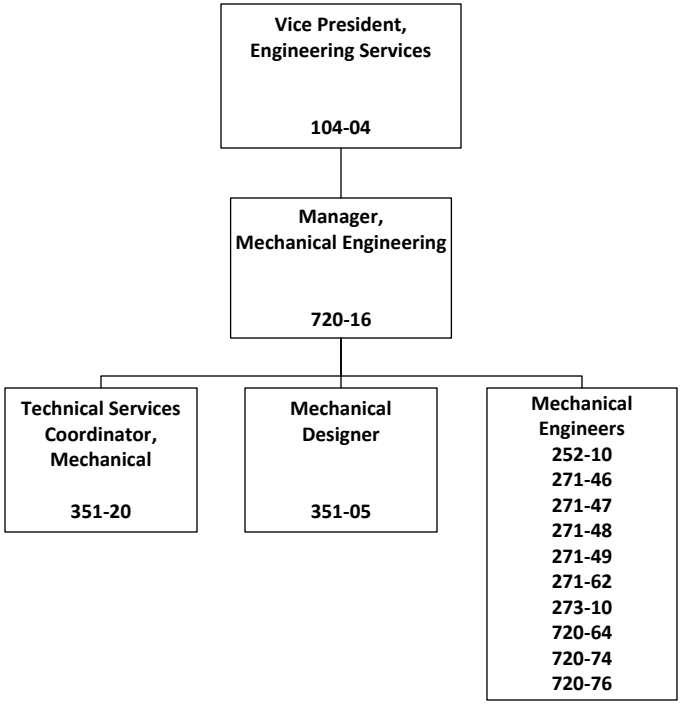
# Engineering Services
# Civil/Transmission & Distribution Engineering



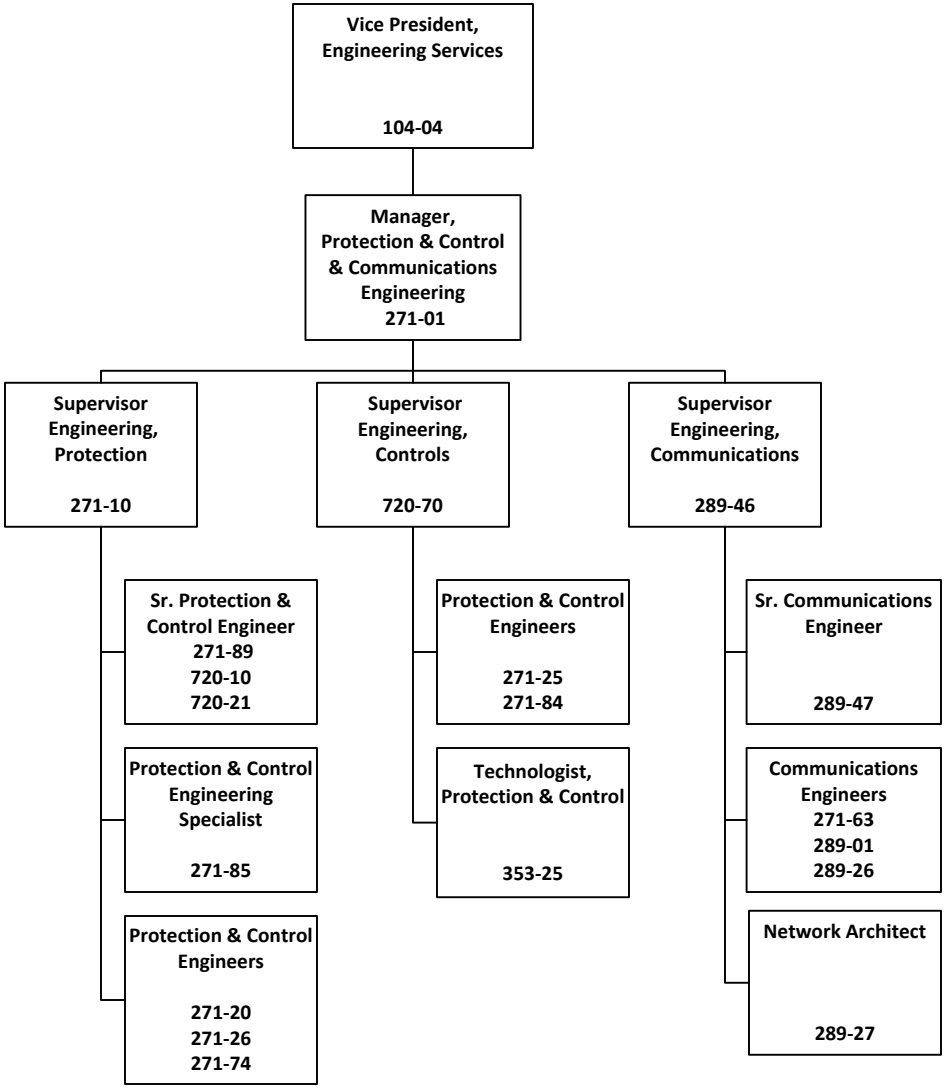
# Engineering Services
# Electrical Engineering



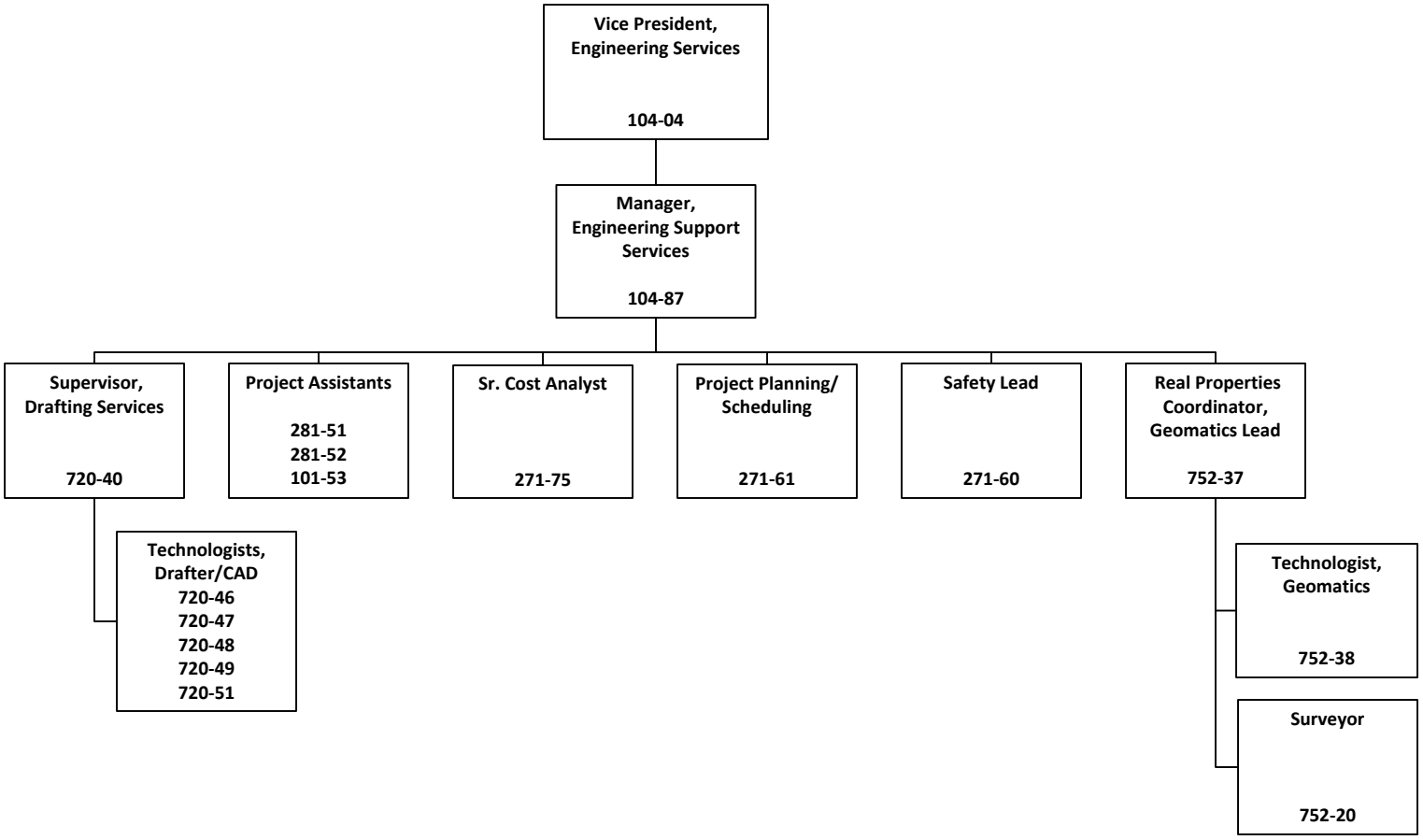
# Engineering Services
# Mechanical Engineering



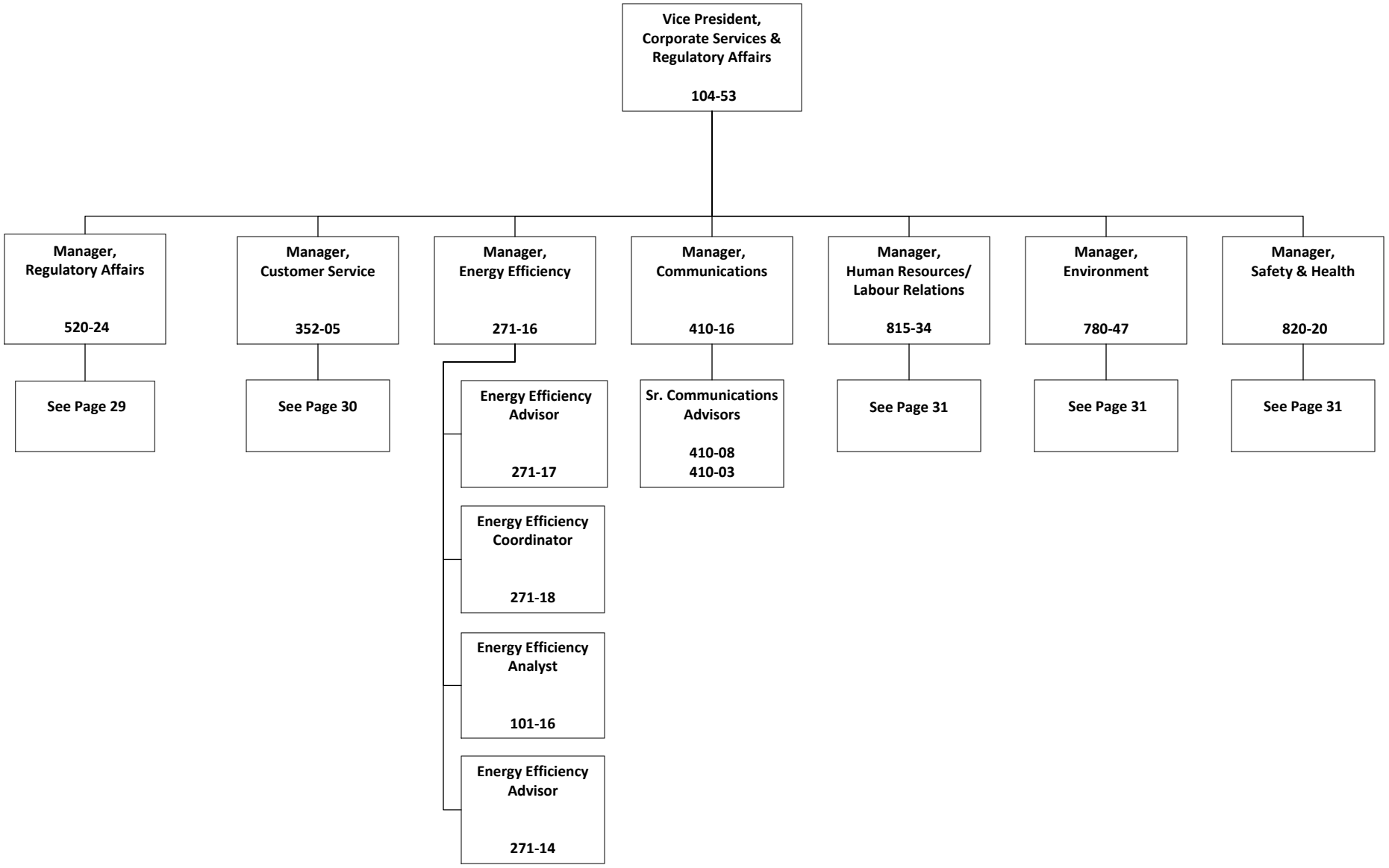
# Engineering Services
# Protection & Control & Communications Engineering



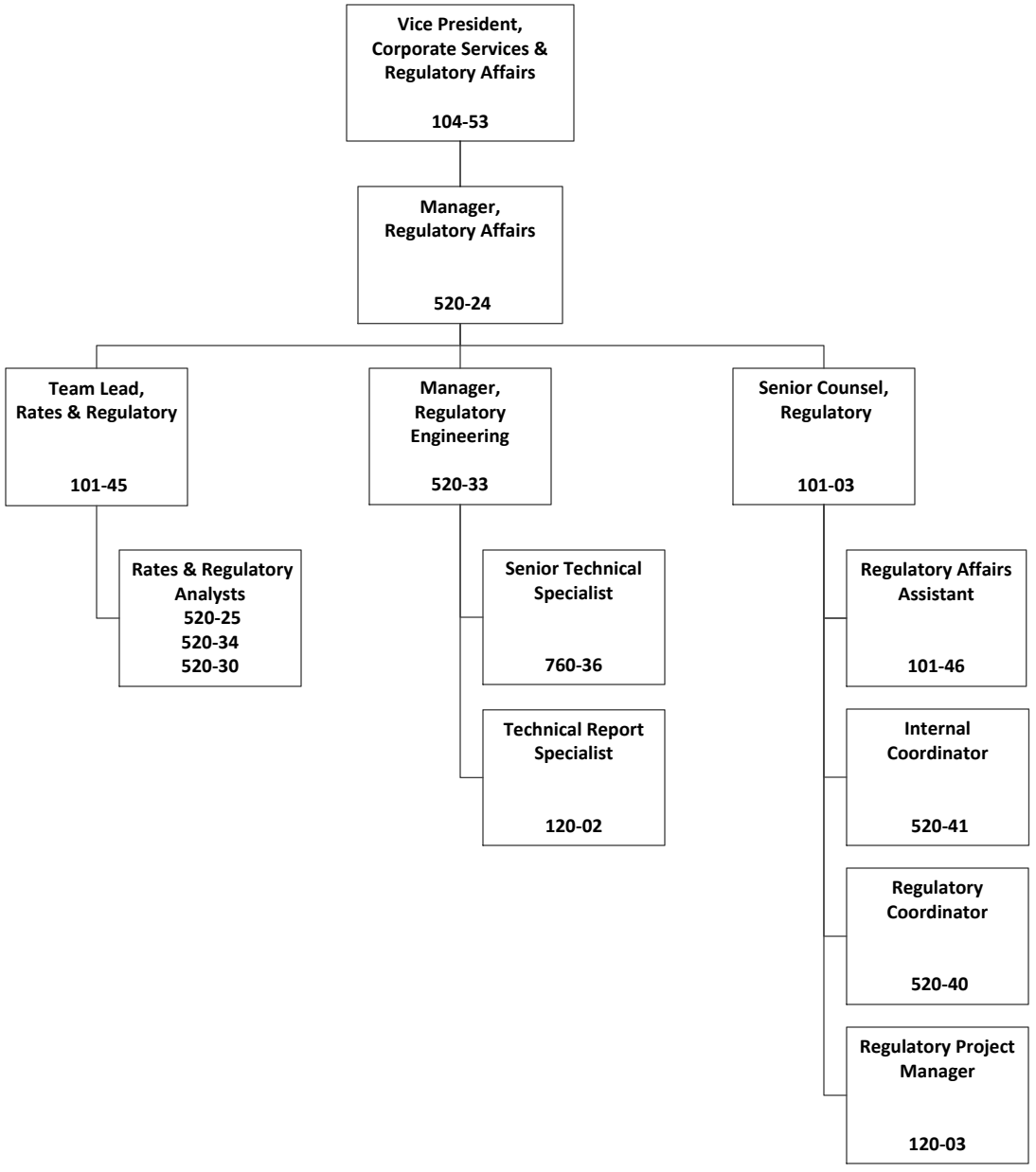
# Engineering Services
# Engineering Support Services



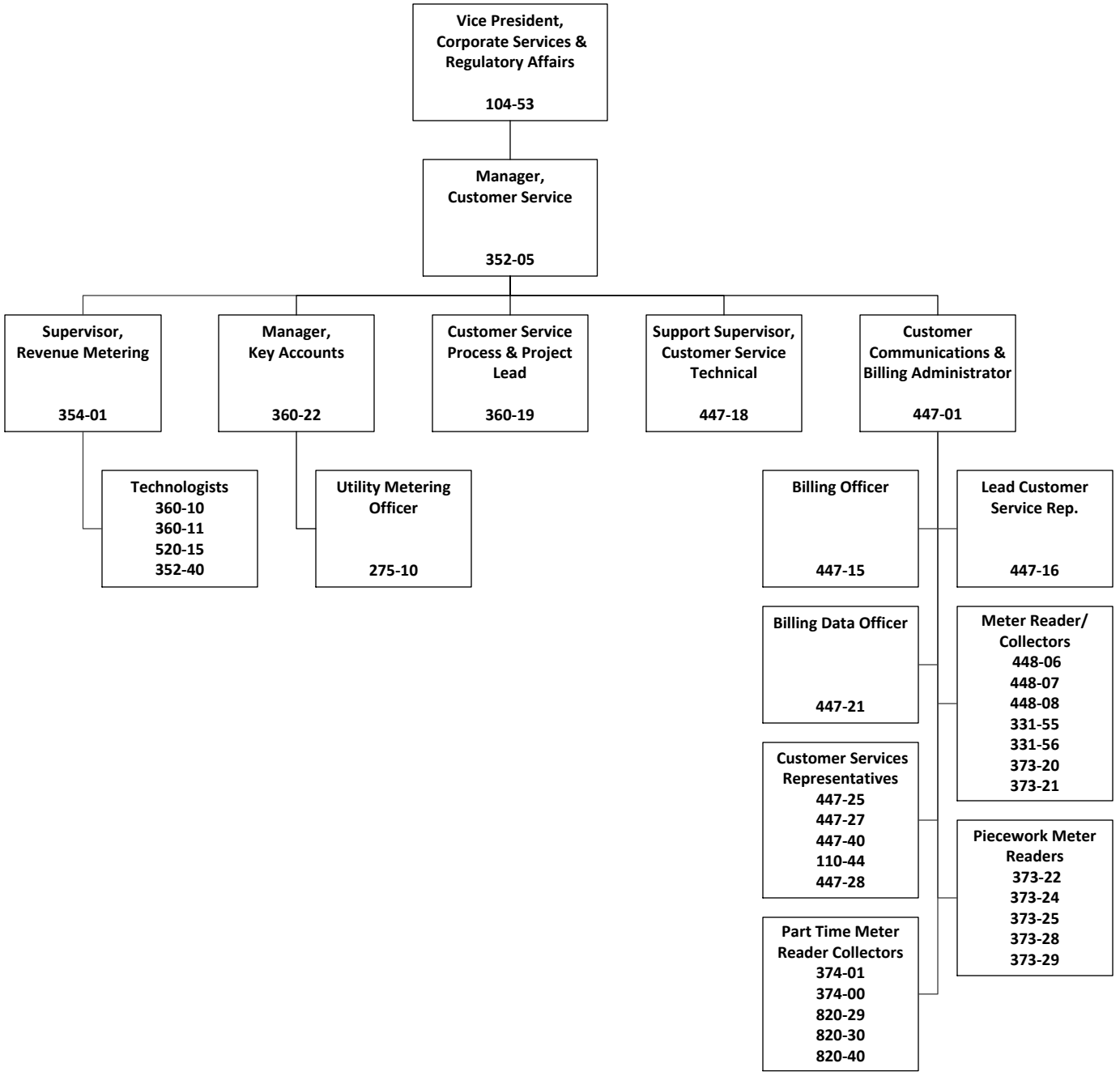
# Corporate Services & Regulatory Affairs



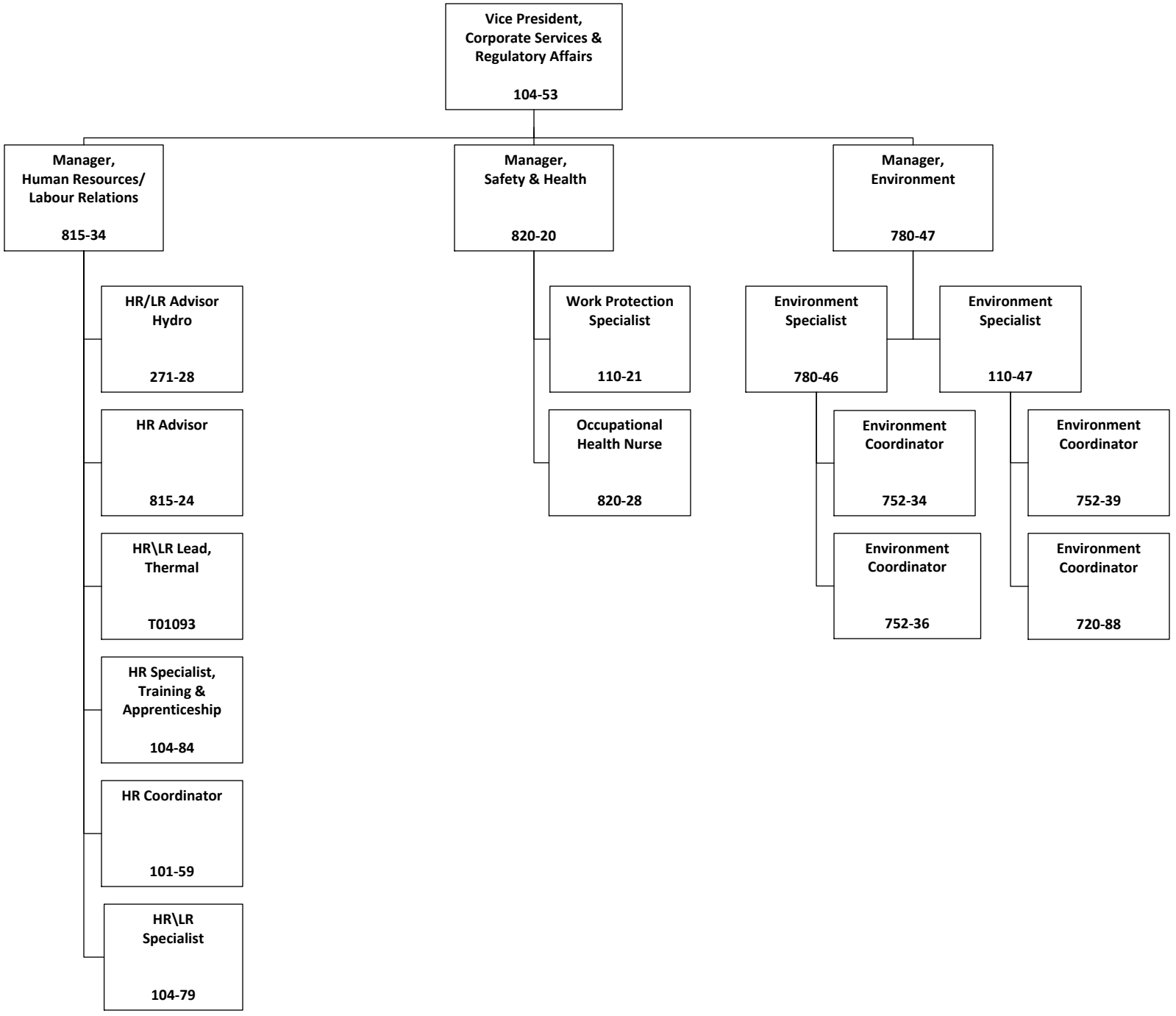
# Corporate Services & Regulatory Affairs
## Regulatory Affairs



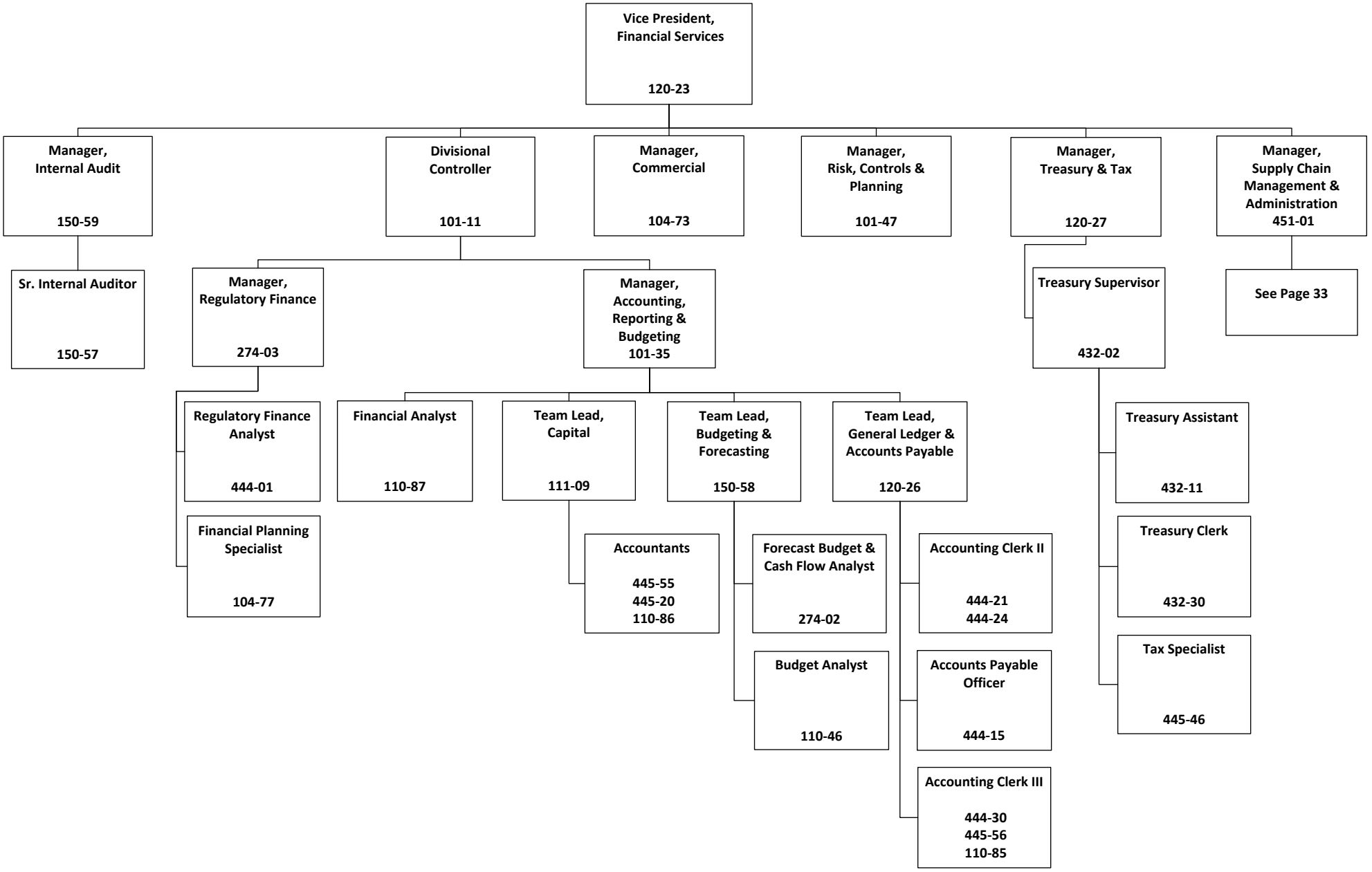
# Corporate Services & Regulatory Affairs
# Customer Service



# Corporate Services & Regulatory Affairs
# Human Resources, Labour Relations, Safety, Health & Environment



# Financial Services



# Financial Services
# Supply Chain Management & Administration

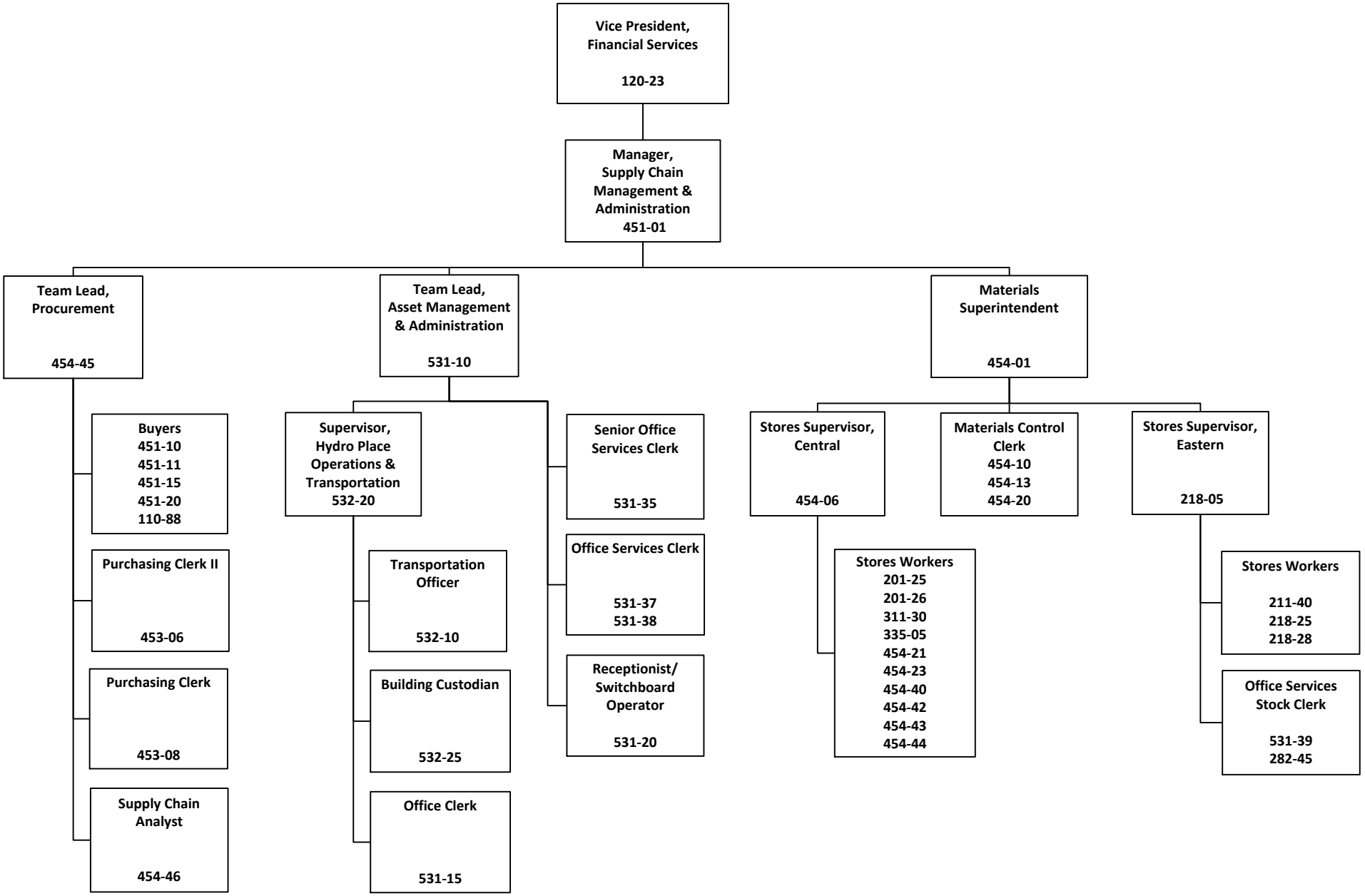


**Exhibit 3 - Customer Service Roadmap Update**

# Customer Service Roadmap Update

## July 2017

# Table of Contents

1.0 Introduction ..... 1
1.1 Customer Service Assessment Using External Vendor to Validate Customer Service Strategy ..... 1
2.0 Goals and Key Performance Indicators ..... 2
3.0 Goals and Objectives ..... 2
3.1 Update on 2014-2016 ..... 2
3.1.1 Development of Account Management Framework ..... 2
3.1.2 Implement New Customer Focused Website ..... 3
3.1.3 Develop a Five-Year Plan for eBilling Penetration ..... 3
3.1.4 Implement Transactional Customer Surveys ..... 3
3.1.5 Complete Process Review of Hydro's Industrial Billing Process ..... 4
3.1.6 Implement Complex Billing Software for Key Accounts ..... 4
3.1.7 Implement Application to Capture Customer Interactions ..... 5
3.1.8 Complete Customer Satisfaction Surveys ..... 5
3.1.9 Investigate and Develop a Solution for a New IVR Phone System ..... 5
3.1.10 Formalize After-Hours Support ..... 6
3.1.11 Implement New Billing & Customer Information System (Utiligy-360) ..... 6
3.2 2017 Planned Objectives ..... 6
3.3 2018 and Beyond ..... 7
4.0 Conclusion ..... 8

## List of Schedules

Schedule I - Customer Service Monthly KPI Dashboard

Schedule II - 2014-2017 Customer Service Strategic Roadmap Initiatives

# 1.0 Introduction

In 2014, Newfoundland and Labrador Hydro (Hydro) developed a customer service strategy for the period 2015 to 2017 (the Customer Service Strategy) to provide a strategic roadmap for delivering improved customer service at Hydro.[1] This report is in response to Order No. P.U. 49(2016), wherein the Board of Commissioners of Public Utilities (the Board) directed Hydro to file a report with its next general rate application setting out its status in meeting the goals and objectives in the Customer Service Strategic Roadmap for the period 2015 to 2017. This report also identifies appropriate Key Performance Indicators (KPIs) and benchmarks against which customer service is measured and reported.

## 1.1 Customer Service Assessment Using External Vendor to Validate Customer Service Strategy

Ernst & Young (EY) was engaged to perform a target operating model rapid assessment for the following areas to validate Hydro's internal findings:

- Contact Centre Strategy;
- Training;
- Quality Assurance;
- Knowledge Management;
- KPI Reporting;
- Customer Experience Insight;
- Payment Processing (Billing);
- Field Operations;
- IVR/Telephony;
- Mobile App & SMS;
- Outage Management; and
- Web Self Service.

[1] A report entitled *Customer Service Strategic Roadmap 2015 - 2017* was filed with the Board on September 30, 2014, and describes a vision for improving service to Hydro's industrial, utility, and retail customers. The report also identified the supporting strategies and guiding principles to meet Hydro's business needs and support long-term customer service strategies.

The results of the assessment identified and prioritized improvement opportunities and initiatives to help Hydro's Customer Service department reach its desired future state. The following sections outline the actions Hydro has taken as it progresses through its Customer Service Strategy.

## 2.0 Goals and Key Performance Indicators

To measure Hydro's progress against its strategy for better serving its customers, four goals were established: employee; customers; process; and financial performance. KPIs were then developed for each goal. The goals and KPIs are reported as a dashboard and results are shared with customer service staff, and Hydro's Leadership Team, on a monthly basis. Hydro's *Customer Service Monthly KPI Dashboard – December 2016*, is provided in Schedule I.

## 3.0 Goals and Objectives

### 3.1 Update on 2014-2016

Since filing the Customer Service Strategy in September 2014, Hydro has accomplished a number of noteworthy achievements. Below are some of the significant activities completed that have enhanced the customer service experience for Hydro's customers. For a detailed list of initiatives and current status refer to Schedule II.

#### 3.1.1 Development of Account Management Framework

An essential requirement identified in Hydro's Account Management Framework was the creation of a dedicated account manager within Hydro's Customer Service department to support Hydro's industrial and identified commercial customers as well as its utility customer, and partner for the deliver of power to island customers, Newfoundland Power.

Acting as a single point of contact between the customer and Hydro, the key account function allows all interactions to be handled via a single channel and be efficiently managed within

Hydro. Once a customer request is received by the Manager, Key Accounts it is their responsibility to advocate on behalf of the customer within Hydro and pursue a resolution.[2]

### 3.1.2 Implement New Customer Focused Website

Hydro launched a new customer focused mobile and web portal platform called *myNLhydro* in April of 2016. *myNLhydro* provides customers with unlimited access to their account anytime, anywhere, and on any device. Users can easily and conveniently:

- View account balance, payment history, and set up payment options online;
- Subscribe to text and email notifications for planned and unplanned power outages;
- View and report power outages online;
- Subscribe to payment reminders via text and email notifications;
- Sign up for paperless eBilling and equal payment plan;
- Track and manage electricity usage in easy-to-read charts, set budget goals, compare power usage year over year, and against the average usage of residents in their neighborhood; and
- Submit service requests.

### 3.1.3 Develop a Five-Year Plan for eBilling Penetration

Hydro developed a five-year plan to increase electronic billing (eBilling) subscriptions to support cost management within Customer Service and meet customer expectations. In 2014 there were 3,522, or approximately 9% of, customers subscribing to eBilling. Hydro's target by 2019 is to increase the subscriptions to approximately 10,000, or 25%, of its customers. The target is tracking according to plan with 7,917, or 20%, of Hydro's customers currently subscribing to the eBilling service.

### 3.1.4 Implement Transactional Customer Surveys

To ensure timely feedback on services provided to customers by Hydro's call centre, Hydro implemented a transactional survey process. Bi-weekly transactional surveys are conducted

[2] Please refer to Hydro's *Key Account Management Report*, filed with the Board on January 13, 2017.

through an automated outbound call service where customers are asked four questions about their most recent experience with Hydro staff. The survey focuses on the quality of service received, staff knowledge of issue, and overall first contact satisfaction. These survey results are reviewed with customer service staff to ensure activities are effective, or to determine if any changes are needed. Transactional survey results for the period of January to March 2017 show that 88% of Hydro's customers are satisfied with the service they received.

### 3.1.5 Complete Process Review of Hydro's Industrial Billing Process

Hydro's objectives for the industrial billing process review were to:

- Document and validate the industrial billing workflow process;
- Identify opportunities to improve the workflow process;
- Identify considerations for implementation of the improvements; and
- Engage stakeholders to aid in their understanding of the industrial billing process, their role in the process, and how their role/activities/outputs affect the process.

This review produced the following outcomes:

- Industrial billing workflow process chart;
- Industrial billing workflow process policy;
- Process review recommendations; and
- Completed RACI (Responsible, Accountable, Consulted, Informed) chart.

The output of this review was then used as part of an initiative to implement complex billing software for Hydro's industrial and wholesale customers, and is discussed in section 3.1.6.

### 3.1.6 Implement Complex Billing Software for Key Accounts

In 2016, Hydro started a project to implement the Itron MV-PBS software application to support industrial and wholesale billing for identified key account customers. The new application, for complex billing, will be more effective, remove manual processes, and minimize potential for input errors, while at the same time improving billing to its largest customers. MV-

PBS will also integrate with the existing industrial meter data collection application, automate calculations, decrease meter-to-bill time, and provide reporting and audit tracking capabilities.

### 3.1.7 Implement Application to Capture Customer Interactions

Hydro implemented a Customer Assistance Database to record all customer interactions digitally. This new system provides a shared database of all customer communications for all Customer Service Representatives (CSRs). The database provides a historical and holistic view of each customer for each time they call that allows the CSRs to reference and improve the customer experience. It also provides reporting and analytics, and provides the customer service team a view of the most frequent call types, facilitating further discussion on broader customer concerns and potential resolutions.

### 3.1.8 Complete Customer Satisfaction Surveys

Since the filing of the Customer Service Strategy the following surveys have been completed:

- Residential Customer Survey;
- In-depth research with Hydro's Key Customers (Industrial and select Commercial);
- Survey conducted with senior staff from Newfoundland Power; and
- Transactional bi-weekly surveys.

Hydro's residential customer satisfaction ratings have remained strong in comparison to the Canadian Electricity Association (CEA) averages, and have shown an upward trend over the past two survey periods, indicating 84% and 90%, in 2014 and 2016, respectively.[3]

### 3.1.9 Investigate and Develop a Solution for a New IVR Phone System

Hydro installed a new Interactive Voice Response (IVR) telephone system to better support its customers. Hydro's enhanced IVR system replaces an older, unsupported system and provides improved functionality such as more specific outage information and links to Hydro's online

[3] CEA averages for the 2014 and 2016 period were 55% and 56% respectively.

customer outage notification application in *myNLhydro* so customers receive up to date information.

### 3.1.10 Formalize After-Hours Support

Hydro established a formal after-hours support arrangement with a third party vendor for handling power outage and emergency calls. *TeleLink* has been trained in and provided with Hydro's process for dealing with power outage and emergency calls. It now provides Hydro with call handling and reporting service for after-business hours customer calls of this nature. *TeleLink* engages on-call staff when required to follow-up with Hydro customers to resolve individual and widespread unplanned outages.

Hydro's customers, as well as Hydro's Energy Control Centre (ECC), have experienced the benefit of this new process as it removes responsibility from ECC operators to manage outage related calls which allows them to focus on supporting the electricity system operation and restoration while customers are served more efficiently and effectively.

### 3.1.11 Implement New Billing & Customer Information System (Utiligy-360)

As part of the Corporate Business Systems Transformation program, Hydro's Customer Service Department will receive a new billing and customer information system. The new system, Utiligy-360, will include improvements to service provided to Hydro's customers and support Hydro's three-year strategic plan. The Utiligy-360 module includes submodules such as account management, billing management and meter management. Through the Business Systems Transformation program, there will be a focus on automating existing manual processes and providing enhanced functionality.

## 3.2 2017 Planned Objectives

Hydro's areas of focus for 2017 are service, communications, billing and payments, collections, key account management, performance measurement, and knowledge management. Hydro's initiatives include i) online, mobile and self-service options; ii) continuation of improvements to

billing and payment options; iii) enhanced outage communications; iv) enhancements to collection processes; v) development of key account management processes and performance indicators; vi) continued target setting for customer interactions; and vii) developing a customer service knowledge database that will be available to all employees who interact with and provide customer service. Schedule II provides a complete list of initiatives and status as of the end of March 2017.

## 3.3 2018 and Beyond

Hydro's Customer Service Team is presently looking beyond its current strategy and will be updating plans to commence initiatives into 2020. The strategy will continue to focus on enhancing the customer experience through continuous improvement of existing processes and procedures, and the implementation of new technology to support process where needed.

The future focus areas for Hydro are:

- Update current Customer Service Strategic Roadmap to 2020;
- Develop a revenue protection strategy;
- Implement a pilot using tablet technology to automate customer information updates during automated meter reading (AMR) projects;
- Further cost reduction initiatives such as increased subscribers to eBilling and redefined collections process;
- Develop Key Account Plans and establish KPIs;
- Develop a five-year plan for Revenue Metering with aim to improve equipment and resource planning;
- Complete customer satisfaction surveys for Key Accounts, and Commercial and Residential customers;
- Closer integration of energy efficiency and customer service teams focused on improved delivery of programs and education to customers;
- Implement new billing and customer information system; and

- Design a new, easier to understand customer bill, with more information, such as consumption trending.

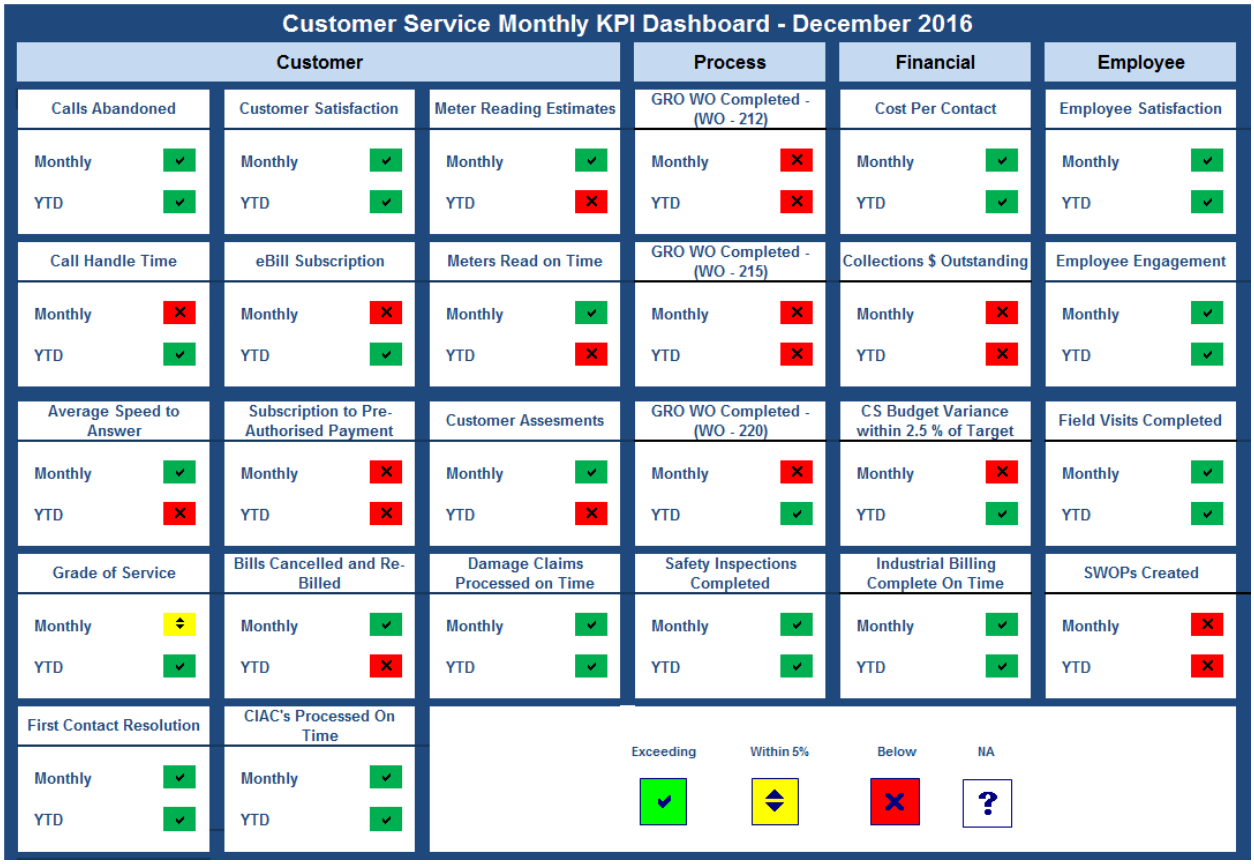
## 4.0 Conclusion

There has been a stronger organizational focus placed on customer service throughout the Company. Hydro continues the execution of its Customer Service Strategy and has seen a number of investments and improvements to software applications, hardware, processes and procedures, training, and the addition of new roles such as the Manager, Key Accounts and Customer Service Process and Project Lead without adding additional full time equivalent positions. The development of a customer service strategy and clear accountability and performance indicators has broadened the corporate focus on customer service.

The strategic plan is being reviewed and refreshed in 2017 to take Hydro into 2020, as it continues to enhance the customer experience for all customers in the province, including those not directly served by Hydro. Based on survey feedback from its customers, Hydro believes its investments and renewed focus are benefiting its customers, and will continue to improve the service it provides.

# Exhibit 3 - Schedule I

# Customer Service Monthly KPI Dashboard


Customer Service Monthly KPI Dashboard - December 2016
Customer
Process
Financial
Employee
Calls Abandoned
Monthly
YTD
Customer Satisfaction
Monthly
YTD
Meter Reading Estimates
Monthly
YTD
GRO WO Completed - (WO - 212)
Monthly
YTD
Cost Per Contact
Monthly
YTD
Employee Satisfaction
Monthly
YTD
Call Handle Time
Monthly
YTD
eBill Subscription
Monthly
YTD
Meters Read on Time
Monthly
YTD
GRO WO Completed - (WO - 215)
Monthly
YTD
Collections $ Outstanding
Monthly
YTD
Employee Engagement
Monthly
YTD
Average Speed to Answer
Monthly
YTD
Subscription to Pre-Authorised Payment
Monthly
YTD
Customer Assesments
Monthly
YTD
GRO WO Completed - (WO - 220)
Monthly
YTD
CS Budget Variance within 2.5 % of Target
Monthly
YTD
Field Visits Completed
Monthly
YTD
Grade of Service
Monthly
YTD
Bills Cancelled and Re-Billed
Monthly
YTD
Damage Claims Processed on Time
Monthly
YTD
Safety Inspections Completed
Monthly
YTD
Industrial Billing Complete On Time
Monthly
YTD
SWOPs Created
Monthly
YTD
First Contact Resolution
Monthly
YTD
CIAC's Processed On Time
Monthly
YTD
Exceeding
Within 5%
Below
NA

# Exhibit 3 -Schedule II

# 2014-2017 Customer Service Strategic Roadmap Initiatives

| Initiative - 2014 | Status |
|---|---|
| Complete current state assessment of customer service process and technology | Completed |
| Develop Customer Service roadmap, excellence framework & vision and plans | Completed |
| Develop resourcing and budget for the outlined strategy | Continual |
| Develop base training & orientation program in Customer Service skills for Customer Service Representatives and technologists | Complete |
| Review and revise outage protocols and processes | Completed |
| Develop long term business case for complete AMR | Completed |
| Define and evaluate current service offerings | Completed |
| Enable online documentation | Completed |
| Formalize after hours support | Completed |
| Complete a review of current billing cycles | Completed |
| Develop a plan with targets for increasing eBilling with customers | Completed |
| Complete requirements of Hydro's QMS program | Completed |
| Develop three year meter replacement plan | Completed |
| Complete 2014 customer satisfaction survey | Completed |
| Work with Newfoundland Power to develop synergies for shared technologies | Completed |
| Create a Customer Service improvement committee | Completed |
| Develop a Customer Service continuous improvement plan | Completed |
| Complete outstanding items related to the Liberty audit | Completed |

| Initiative - 2015 | Status |
|---|---|
| Promote eBilling with customers | Completed |
| Identify Customer Service Project Team | Completed |
| Structure cross functional customer steering committee leading and advising on long term customer service strategy are focused on "making it right“ | Completed |
| Complete resource assessment for Customer Service Strategy execution | Completed |
| Scope and secure external resource support | Completed |
| Develop communication strategy for social media integration | Continual |
| Develop strategy for tighter cross functional integration with takeCharge team to maximize customer value | Completed |
| Conduct internal focus groups and research for input on strategy | Completed |
| Develop training program for all customer touchpoints/contacts on broader strategy, standards, processes, etc. | Completed |
| Framework developed for integrated account management for commercial and key customers | Completed as part of the Account Management Framework – Section 3.1.1 |
| Implement new customer focused web site with mobile capabilities | Completed as part of *myNLhydro* implementation – Section 3.1 |
| Implement process and software to track customer interactions | Completed as part of the Customer Assistance Database implementation – Section 3.1.7 |
| Implement process to establish transactional surveys as part of broader research and insights plan | Completed as per the customer transactional surveys process – Section 3.1.8 |
| Enhance Customer Service account information online web portal | Completed as part of *myNLhydro* implementation – Section 3.1 |
| Review AMR business case being developed by engineering | Completed |
| Create an action plan from the customer satisfaction survey | Completed |
| Broaden company strategy to enhance industrial and Newfoundland Power customer experience | Completed as part of the Account Management Framework – Section 3.1.1 |
| Secure Hydro Leadership Team alignment | Completed |
| Establish regular reporting and updates to Hydro Leadership Team | Completed |

| Initiative - 2016 | Status |
|---|---|
| Develop service standards, establish KPIs for services | Completed |
| Investigate new metering/billing/customer interface systems and make recommendations for 2016 implementation | Completed as part of *myNLhydro* , IVR, and Utiligy implementations – Sections 3.1.2, 3.1.9, and 3.1.11 |
| Enhance customer communications through an upgraded IVR phone system | Completed as part of IVR implementation – Section 3.1.9 |
| Begin assessment of automated billing tools | Completed |
| Complete an assessment of key Customer Service processes and procedures and map corporately | Completed |
| Complete a Customer Service maturity assessment | Planned for 2017 |
| Develop a Customer Service complaint process | Planned for 2017 |
| Customer Service Training plan for Energy Efficiency | Completed |
| Define new online service offerings determined for customers integrated with billing application | Completed as part of *myNLhydro* implementation – Section 3.1.2 |
| Upgrade MV-PBS application to improve billing process | Planned for 2017 |
| Develop a research strategy and conduct deep research to understand Hydro customers and their expectations | Completed |
| Map all key customers processes & associated work flow | Continual |

| Initiative - 2017 | Status |
|---|---|
| Launch online service offerings | Completed as part of myNLhydro implementation – Section 3.1.2 |
| Complete mobile and self-service options | Completed as part of myNLhydro implementation – Section 3.1.2 |
| Continue to improve billing and payment options | Completed as part of myNLhydro implementation – Section 3.1.2 |
| Investigate an outage system – online & IVR system and implement enhancements | Completed as part of *myNLhydro* , and IVR, implementation – Sections 3.1.2 and 3.1.9 |
| Clear targets for customer interactions such as eBilling, autopay, account alerts | Completed as part of eBilling implementation – Section 3.1.3 |
| Create a Customer Service knowledge base that can be shared across the organization | Ongoing |
| Implement enhancements to the collection process such as automated outbound calling, effective and efficient processes | Ongoing |
| Complete a Customer Service maturity assessment and revise strategy as required | Ongoing |
| Develop performance indicators for key account management around planned and unplanned outages, service reliability, and requests and response time | New |
| Develop a specific account plan for each key account that includes strategies, objectives, initiatives, and measurement of plan performance | New |
| Complete the interconnection process document for industrial customer requests | Completed |
| Complete the interconnection process document for large general service customer requests | New |

**Exhibit 4 - Report on Rural Subsidy Communication to Customers**

# Identification of the Rural Subsidy on Customer Bills Report

## July 2017

## Table of Contents

1.0 Introduction ..... 2
2.0 Hydro Activities ..... 4
2.1 Research on Jurisdictional Practices ..... 4
2.2 Consumer Survey ..... 7
2.3 Options to Address Transparency ..... 8
3.0 Other Concerns and Potential Issues ..... 9
4.0 Conclusion ..... 10

## List of Schedules

Schedule I – Subsidized Rate Study Report

# 1.0 Introduction

Hydro owns and operates 21 isolated diesel generating plants serving approximately 4,500 customers throughout Newfoundland and Labrador. Hydro also serves rural customers on the Island Interconnected System and has approximately 23,000 customers in 182 communities on the south coast, northeast coast, and along the Great Northern Peninsula. The cost of providing service to these approximately 27,500 rural customers exceeds the revenues collected from rates, resulting in a deficit which is commonly referred to as the Rural Deficit. Until 1989, the Rural Deficit was funded by Government; however, as a result of a change in policy by Government in 1989, the Rural Deficit is currently funded by means of a cross-subsidy from other ratepayers.

The rural deficit adds to the cost of electricity for Newfoundland Power and for Labrador Interconnected customers. Industrial Customers have not contributed to the Rural Deficit since 1999. Hydro's rates designs for its Hydro Rural customers reflect Government direction.[1] The Hydro Rural customers on the Island and in the Labrador Straits area pay the same rates as those charged by Newfoundland Power to its customers. These rates automatically change as Newfoundland Power alters its rates. In the case of isolated systems' customers, the rates charged by Newfoundland Power apply to the lifeline block; however, rates beyond this level of consumption are higher.[2]

The forecast Rural Deficit for the 2018 Test Year and 2019 Test Year is approximately $67 million and $72 million, respectively. The Rural Deficit increases rates for customers of Newfoundland Power by approximately 10%[3] and 15% for retail customers on the Labrador Interconnected System.[4]

[1] Order in Council 2003-347 provides government direction on Hydro Rural rate designs.
[2] The purpose of the lifeline block is to provide domestic households located on diesel systems with access to electricity at an affordable price for essential, non-substitutable end-use requirements. The size of the lifeline block ranges from 700 kWh per month in non-winter months to 1,000 kWh per month in the winter months.
[3] The Newfoundland Power wholesale rate is 15% higher as a result of the requirement to pay the Rural Deficit. However, because Hydro's cost to serve Newfoundland Power represents approximately 67.5% of the cost to serve the customers of Newfoundland Power, the Rural Deficit impacts retail customer bills by approximately 10%.
[4] The Labrador industrial customers are not required to pay the Rural Deficit.

In Hydro's 2013 Amended General Rate Application (GRA) proceeding, the Consumer Advocate supported a recommendation made by Dr. James Feehan to include rural subsidy information on customer bills.[5] Currently, customer bills do not include information specifically related to the rural subsidy. Hydro identified concerns with that proposal and submitted that further information was required.[6]

In Order No. P.U. 49(2016), the Board of Commissioners of Public Utilities (the Board) determined that the implications of including rural subsidy information on customer bills should be carefully considered before a decision on the proposal is made. The Board also acknowledged there may be other options available to provide rural subsidy information to customers.[7] The Board directed Hydro to provide a report with its next GRA identifying:[8]

- practices in other jurisdictions;
- other options to address transparency concerns;
- what, if any, information customers would like to have on their bills in this circumstance; and
- any other concerns or potential issues and options to address these concerns.

[5] Dr. Feehan's recommendation was made in his Report on the Allocation of the Rural Deficit, dated April 20, 2014. The Consumer Advocate supported this recommendation on page 55 of his final written submission to the 2013 Amended GRA proceeding, dated December 23, 2015.
[6] Hydro's Final Written Submission to the 2013 Amended GRA, Revision 1, dated January 22, 2016, page 95.
[7] Order No. P.U. 49(2016), page 91.
[8] Ibid.

## 2.0 Hydro Activities

Hydro has completed the following activities to inform a plan on this matter.

### 2.1 Research on Jurisdictional Practices

Hydro conducted a jurisdictional scan of the practices of other utilities to determine what information, if any, is communicated to their customers regarding rate subsidization, and how this is done.[9] The results suggest that in jurisdictions utilizing some form of subsidization between high-cost, rural/isolated customers and lower cost urban/interconnected customers, communication of subsidy amounts on customer bills is common when the subsidization is provided by Government. When the subsidization is provided by utilities' customers, Ontario was the only province in which information was provided on customer bills concerning subsidization. Below is a brief summary of the findings per province and territory.

*Newfoundland and Labrador*

Hydro identifies on its Labrador Isolated residential customer bills the Northern Strategic Plan (NSP) rebate funded by the Provincial Government. The customer bill impact of the NSP rebate effectively results in customers on the Labrador Isolated Systems paying the same electricity rate as the customers on the Labrador Interconnected system for their monthly customer charge and the lifeline block.

Neither Hydro nor Newfoundland Power provide information on customer bills concerning the Rural Deficit subsidization reflected in customer rates.

*Ontario*

Hydro One Remote Communities Inc. generates and distributes electricity to 21 communities in the most northern part of the province. Ontario has a Rural or Remote Rate Protection Program (RRRP), which is designed to reduce costs for eligible customers located in rural or remote

[9] Hydro conducted a survey of the following utilities: BC Hydro, NB Power, Manitoba Hydro, Hydro Quebec, Northwest Territories Power Corporation, Yukon Energy, Nova Scotia Power, and Hydro One. Information included in this report is based on responses provided and publically available information.

areas, where the cost of distributing electricity to these customers is higher than distributing to customers in more urban areas. The RRRP cost is recovered from all electricity customers in the province through a charge that is reviewed annually and approved by the Ontario Energy Board (OEB).[10]

The RRRP appears on the tariffs of rates and charges of all licensed Ontario electricity distributors and is included as one of several components of the Regulatory Charges line item located on customers' bills. The RRRP is credited monthly to eligible customers at a flat dollar amount. Customers who receive the RRRP credit have a line item on their bill which indicates how much RRRP they receive.

Customers in Ontario can learn more about the contents of their electricity bills by accessing the Understanding your Electricity Bill page on the OEB's website. The website explains the contents of the Regulatory Charges line item on customer bills.[11]

On June 1, 2017, the *Ontario Fair Hydro Act* came into effect, which removed some of the cost of the RRRP from electricity bills, and instead funds the majority of the RRRP program through taxes. As such, effective July 1, 2017, approximately 80% of the RRRP charge is paid by taxpayers. The remaining amount continues to be paid by ratepayers.[12]

*Manitoba*

Manitoba Hydro serves 4 communities on 4 isolated systems with 767 customers. Their Domestic customers pay the same rates as grid customers. There is an inclining block rate for General Service customers. Manitoba Hydro does not track details on the amount of rural subsidization.

[10] Approval for 2017 was made in Order No. EB-206-0362, dated December 15, 2016.
[11] https://www.oeb.ca/newsroom/2017/fair-hydro-act-2017
[12] https://www.oeb.ca/newsroom/2017/fair-hydro-act-2017 and http://www.ieso.ca/sector-participants/ieso-news/2017/02/rural-and-remote-electricity-rate-protection-charge-increase-for-2017

Manitoba Hydro's rural subsidization is recovered in several ways: through a rate surcharge applicable to government customers served by diesel generation; through government capital contributions; and through reductions to the utility's net income. There is no presentation of rural subsidization on customer bills.

*British Columbia*

BC Hydro has 24 communities served on 13 isolated systems serving 6,400 customers. There are inclining block rates for Domestic and General Service customers. BC Hydro does not track details on the amount of rural subsidization.

BC Hydro recovers the rural subsidization provided to customers on isolated systems from customers on the integrated system. BC Hydro also receives federal funding for First Nations communities where BC Hydro has, in recent years, taken over the provision of electricity service from the Federal Government. There is no presentation of information on rural subsidization on customer bills.

*Northwest Territories*

Northwest Territories Power Corporation (NTPC) has 22 communities served on 22 isolated systems serving approximately 6,300 customers. The subsidization of customer rates based on the Yellowknife rate is provided by Government.

The amount of the subsidy provided to customers is identified on the monthly bills of the customers that are subsidized. [13]

*Yukon*

Based on a review of the Yukon Electrical website, Hydro determined that the Yukon Government program provides a rebate to reduce the bill for the first 1,000 kWh of usage on residential accounts. This rebate is identified on customer bills.

[13] https://www.ntpc.com/customer-service/territorial-power-support-program---tpsp

*Nunavut*

The Government of Nunavut provides the Nunavut Electricity Subsidy Program (NESP) in support of the development of northern businesses and the encouragement of private home ownership. The cost differential between Iqaluit rates and those of other Nunavut communities is provided by the NESP up to specified consumption levels.[14]

For residential customers, the subsidization is identified as the NESP and is automatically deducted from their power bills. Commercial customers must apply for the available rebate.

## 2.2 Consumer Survey

Hydro engaged Corporate Research Associates (CRA) to conduct quantitative research to assess Newfoundland and Labrador residents' perceptions of rural subsidization of electricity rates in the Province. The research was completed by a random telephone survey of 600 participants who pay a utility bill. Of the respondents, 400 contribute to subsidized rates and 200 receive the subsidy. Overall findings provided results accurate to within +/- 4.0%. Key findings from the research are:

- There is limited awareness about rate subsidization in the Province, but residents are keen to know more, regardless of whether they contribute to or receive subsidization.
- Across the Province, customers expressed a desire to learn more about the different costs included in their power bills and how rates are determined.
- Customers would like more information about subsidization of rates, including what they are paying or receiving in terms of a subsidy. Over 90 percent of customers agreed that this information should be identified on their bill, regardless of whether they contribute to or receive subsidization.

[14] Source:http://gov.nu.ca/sites/default/files/files/NU%20Electricity%20Subsidy%20Program%20Contribution%20Policy.pdf.

- When asked what would be the best way for an electricity provider to inform customers on the topic of electricity costs and the rural rate subsidy, a variety of mediums were mentioned.[15]
- Results show that power bills are considered a key method of communication, either through information included directly on the power bill or provided as a bill insert. However, younger residents (aged 18-34) are more likely to prefer to receive information by email, website or online.
- Across the Province, most electricity customers recognize that identifying a subsidy on the power bill may create a negative perception of higher cost communities, or rural Newfoundland and Labrador; however, that does not impede the clear preference for information on subsidization.

A copy of the Subsidized Rate Study report prepared by CRA is provided as Schedule I.

Any decision relating to the identification of the rural subsidy on customer bills will impact Newfoundland Power as it is their customers that pay a significant share of the rural subsidy and the billings to those customers would also have to be changed. Hydro is consulting with Newfoundland Power regarding how best to communicate information on the Rural Deficit to customers.

## 2.3 Options to Address Transparency

The rural subsidy is presently embedded within the electricity rates of Hydro and Newfoundland Power, which may present transparency concerns. However, the provision of a high-level rural subsidy overview on a web page and an annual bill insert with a similar level of explanation may be a reasonable option to communicate details of the Rural Deficit to customers.[16] The presentation of information with respect to the Rural Deficit on customer bills

[15] The most common mediums mentioned include: on power bills; direct mail out to customers; email; and as bill inserts.
[16] In Ontario, the subsidy details are provided on the utility and regulatory websites.

is also an option. However, this approach requires a more detailed review of potential issues that may arise.

## 3.0 Other Concerns and Potential Issues

Depending on the level of detail provided and the method in which it is provided, identifying the rural subsidy on customer bills may present various issues and concerns for Hydro. Potential concerns include, but are not limited to the following:

- Should the rural subsidy be shown separately on the bills of individual customers who pay it?
- Should the rural subsidy be shown separately on the bills of customers who receive it?
- Should the rural subsidy be shown on a per kWh basis, or flat charge or credit, as applicable?
- Will presentation of the rural deficit on the bill as a charge or savings (i.e., for those receiving the subsidy) cause confusion for customers?
- Some customers have accounts located in areas that both pay the rural subsidy and receive subsidization. A bill from Newfoundland Power showing a Rural Deficit costs and a bill from Hydro showing a Rural Deficit savings may cause confusion and dissatisfaction.
- Can the existing utility billing system deal with either a new cost item or credit item?
- What costs are associated with modifying the billing systems? How much cost should be incurred to permit the identification of the Rural Deficit on customer bills and any continued adjustments over time?
- Will the addition of the cost or savings item resulting from rural subsidization create increased call volumes to the call centres and increased operating costs to customers?
- Will credit concerns arise from some customers refusing to pay the portion of their bill related to the Rural Deficit?

## 4.0 Conclusion

Subsidization is inherent in all electricity rates because it is not practical to attempt to isolate the precise costs of serving each individual customer. Based on a review of utilities' practices in Canada, it is not common for utilities to identify on customer bills the subsidization required to provide affordable electricity to high cost rural systems.

In the Province of Newfoundland and Labrador, the degree of rural subsidization reflected in customer billing is materially higher than in other jurisdictions. The results of Hydro's customer research indicate that customers want more information on the degree of rural subsidization.

Hydro acknowledges that consumers have a particular interest in the formulation of electricity rates and billing; however, there are methods by which Hydro can provide customers with adequate information regarding the composition of their bills without explicitly providing the rural subsidy as a line item on bills, which, based upon a preliminary review, is complex. This includes posting information on its website and including a bill insert with an explanation of the rural subsidy.

Hydro will work with Newfoundland Power to develop a communications plan for providing more transparency to customers on the Rural Deficit to ensure alignment and consistency for the provincial customer base. When the communication plan has been developed, Hydro will provide the plan to the Board.

# Exhibit 4 – Schedule I

# Subsidized Rates Study

# Report

# *Subsidized Rate Study*

**Prepared for Newfoundland Labrador Hydro**

May 2017

newfoundland labrador hydro
a nalcor energy company

CRA
CORPORATE RESEARCH ASSOCIATES

Accredited Gold Seal Corporate Member

NL Hydro will be making a recommendation to the Public Utilities Board regarding how the issue of 'rural subsidy' should be handled with its customer base. To direct its recommendation, NL Hydro was interested in conducting quantitative research to assess Newfoundland & Labrador residents' perceptions on the topic. Primary research objectives included:

- Assess the current level of awareness of power rate subsidization in the Province;
- Determine how Newfoundlanders and Labradorians feel about the issue of subsidization;
- Identify consumers' interest in learning more on this topic (e.g. is there a desire for additional information and what specific type of information would consumers be interested in); and
- Identify consumers preferred method of communication on this topic.

To meet research objectives, NL Hydro and its agency of record (National PR) commissioned Corporate Research Associates to undertake the ***Subsidized Rate Study*** within Newfoundland and Labrador. Given that the results of this study would inform policy decisions, a random telephone methodology using a probability sample was employed. More specifically, a total of 600 random telephone surveys were conducted, with adults 18 years of age and older, who pay a utility bill. Overall findings provide results accurate to within +/- 4.0%. Of note, 400 surveys were completed with those who are subsidizing power rates, while 200 were completed with those who are subsidized. Further, cell sample was included to provide access to the younger demographic.

To ensure representation of the population, region, gender and age quotas were established and overall results were weighted to ensure accurate representation of the population's true distribution.

The following summary report presents an overview of the ***2017 Subsidized Rate Study*** and includes study highlights and an analysis of survey findings. Appended to this report is a copy of the questionnaire (Appendix A).

# Executive Summary & Direction

The results of the ***2017 Subsidized Rate Study*** confirm that while there is limited awareness of a rate subsidization in Newfoundland and Labrador, residents are keen to learn more about the subsidization, regardless of whether they are being subsidized or are subsidizing. Highlights of the survey findings are as follows:

- ***The vast majority of NL residents are aware that NL Hydro both generates power and delivers power directly to customers***. NL Hydro customers are more likely than Newfoundland Power customers to express awareness.
- ***There is limited awareness of a rate subsidization in NL***. Perceptions are generally consistent across the population, with no marked difference by utility or by region.
- Across the Province, ***electricity customers express a strong desire for more information*** about the different costs included in their electricity bill and how power rates are determined. Results are consistent across the population.
- The vast majority of electricity customers (across regions and utilities) ***regularly review their power bill***, and the likelihood of reviewing a bill increases with age.
- Electricity customers ***clearly want more information about the subsidization of rat***es, including what they are paying or receiving in terms of a subsidy. ***There is an expectation that such information would be provided on their power bill***.
- Across the Province, most electricity customers recognize that ***identifying a subsidy on a power bill may create a negative perception*** of higher cost communities or rural Newfoundland and Labrador. This recognition, however, does not impede the clear preference for information on subsidization.
- Although the ***power bill will play a key role*** in communicating to customers on electricity rates and rural rate subsidies, findings suggest a ***multi-mode communications strategy is warranted***.
- ***There is significant opportunity to expand customers' participation in both an equal payment plan and an automatic payment plan***. Only a minority of electricity customers are enrolled in an equal payment plan, although incidence is higher among Newfoundland Power customers. Few customers are signed up for an automatic payment plan.

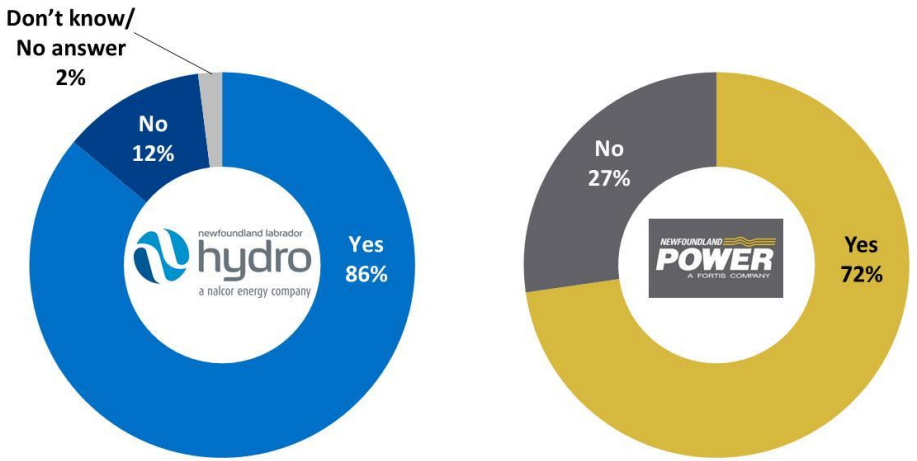
# Detailed Results

***The vast majority of NL residents are aware that NL Hydro both generates power and delivers power directly to customers.***

Survey respondents were told that in Newfoundland and Labrador (NL), there are two electricity utilities. In particular, they were told that NL Hydro is a crown corporation, owned by the Government of Newfoundland and Labrador and is the primary generator of electricity in the Province. Newfoundland Power, an investor-owned utility company, is the primary distributor (or service provider) on the island, delivering electricity directly to homes and businesses.

- The vast majority of NL residents (76%) are aware that NL Hydro not only generates power but also delivers power directly to customers throughout Labrador and to rural and coastal communities across the Province. Although findings are generally consistent across the Province, NL Hydro customers are more likely than Newfoundland Power customers to express awareness. Similarly, residents over the age of 55 are most likely to have such knowledge.

**Aware That NL Hydro Generates and Directly Delivers Power to Customers Throughout NL**

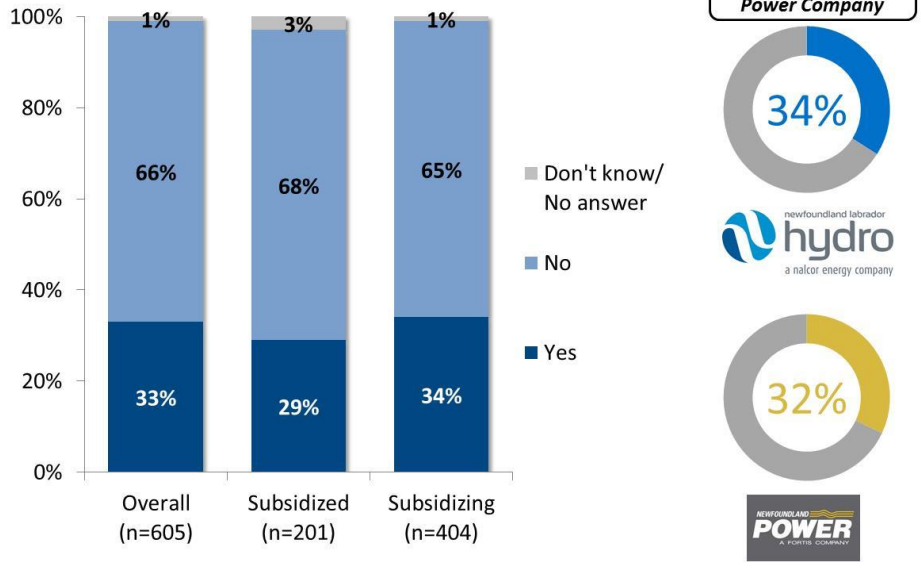



Q.6: (following description) Are you aware that NL Hydro, not only generates power but also directly delivers power directly to customers throughout Labrador and over 200 rural and coastal communities across the province? (NL Hydro n=250, Newfoundland Power n=338)

***There is limited awareness of a rate subsidization in NL, regardless of location.***

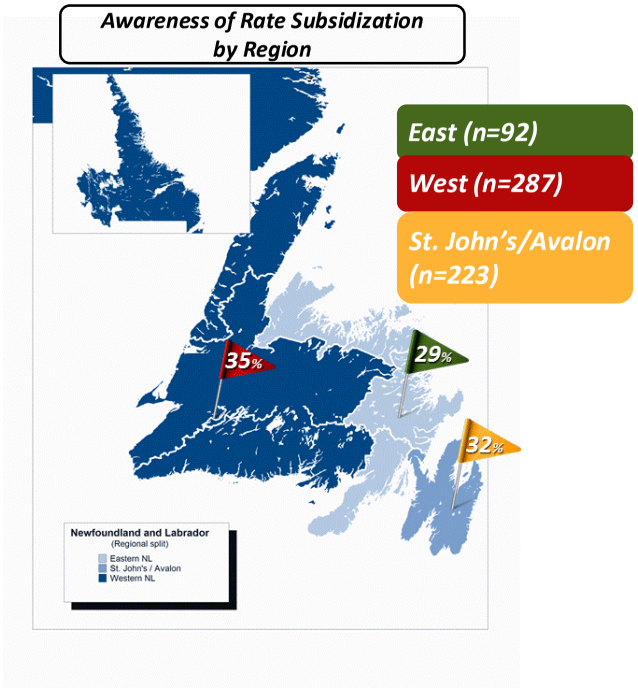
- Residents are generally unaware that most customers outside certain rural areas pay between 10 and 15 percent more on their monthly power bill to help make power more affordable for customers in those rural and remote communities. In fact, only three in ten residents were generally aware of such subsidization.
- Perceptions are generally consistent across the population, with no marked difference by utility or by region. The exception to this is across gender and age, with males being almost twice as likely as females to be aware (42% vs 23%), and older residents being more than twice as likely as those aged 18-34 (41% vs 16%) to be aware of subsidization.

## Awareness of Rate Subsidization







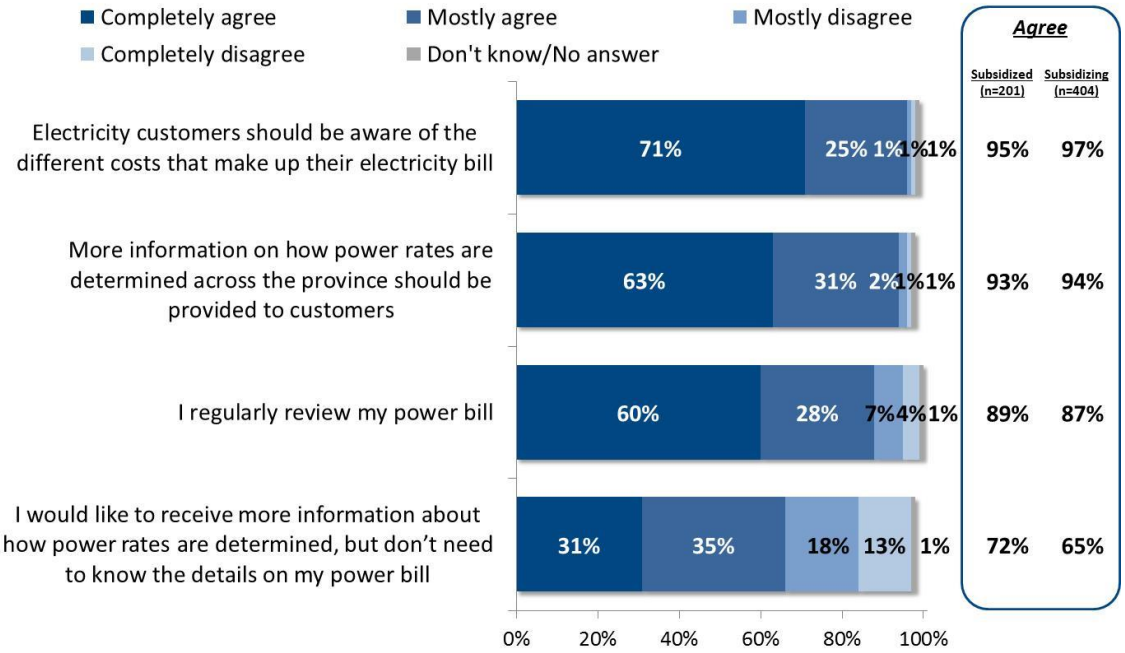



Q.7: (following description) Were you aware that most customers outside of those rural areas pay between 10 and 15 percent more on their monthly power bill to help make power more affordable for customers in those rural and remote communities?
(NL Hydro n=250, Newfoundland Power n=338)

***Across the Province, electricity customers express a strong desire for more information about the different costs included in their electricity bill and how power rates are determined. Results are consistent across the population.***

- Electricity customers clearly believe they ***should be aware of the different costs that make up their electricity bill***, regardless of whether or not they are subsidized or subsidizing. Results are consistent across regions and all demographics.
- Similarly, customers strongly agree that ***more information should be provided to customers on how power rates are determined*** across the Province.
- The vast majority of electricity customers (across regions and utilities) reportedly ***regularly review their power bill***, and likelihood of reviewing their bill increases with age.
- While the need for information about how power rates are determined is pronounced, customers do not believe details need to be provided on their power bill. While opinions are generally consistent, subsidized customers are ***less likely*** to feel this way, as are older customers.

## Opinion of Statements About Power Rates and Bills

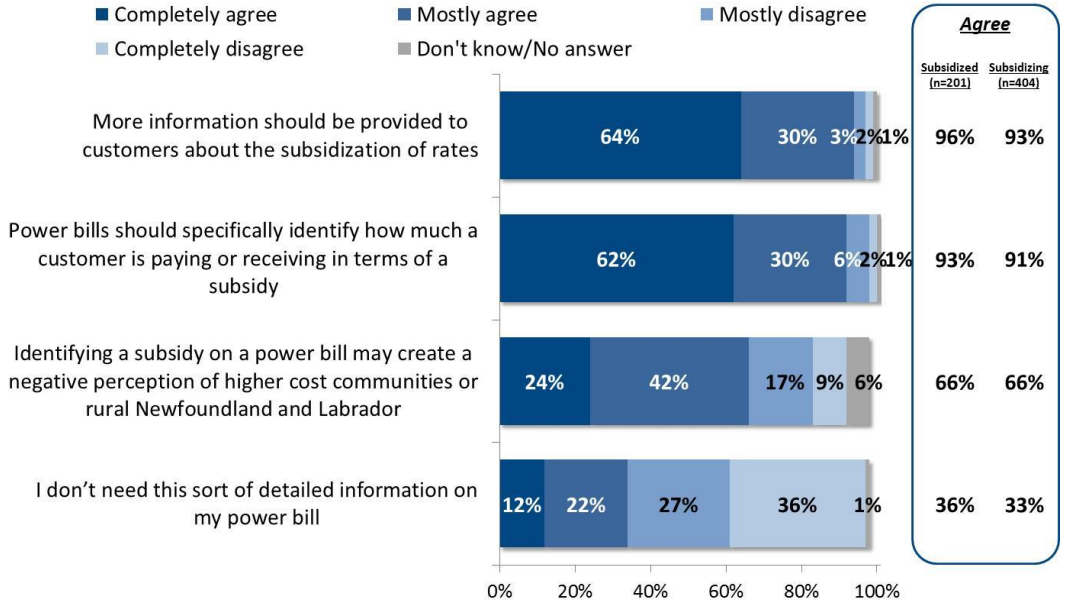



Q.8a, e, g-h: Please indicate whether you completely agree, mostly agree, mostly disagree, or completely disagree with each of the following statements? (n=605)

***Electricity customers clearly want more information about the subsidization of rates, including what they are paying or receiving in terms of a subsidy. There is an expectation that such information would be provided on their power bill.***

- Regardless of whether or not a customer is paying or receiving a subsidy, customers concur that more information should be provided about the subsidization of rates. Further, almost all customers believe that how much a customer is paying or receiving in terms of a subsidy should be identified on a power bill and most customers would like to see detailed information regarding subsidization on their power bill.
- Results are consistent across the population, although older customers are more likely than their younger counterparts to believe that they don't need such detailed information on their power bill.
- Across the Province, most electricity customers recognize that identifying a subsidy on a power bill may create a negative perception of higher cost communities or rural Newfoundland and Labrador. This recognition, however, does not impede the clear preference for information on subsidization.

## Opinion of Statements About Power Rates and Bills




Q.8b-d, f: Please indicate whether you completely agree, mostly agree, mostly disagree, or completely disagree with each of the following statements? (n=605)

***Multiple communications mediums are suggested to best communicate to customers on electricity rates and rural rate subsidies.***

When asked what would be the ***best*** way for an electricity provider to inform customers on the topic of electricity costs and rural rate subsidies, a variety of mediums were mentioned, suggesting that no one communication source should be used in isolation.

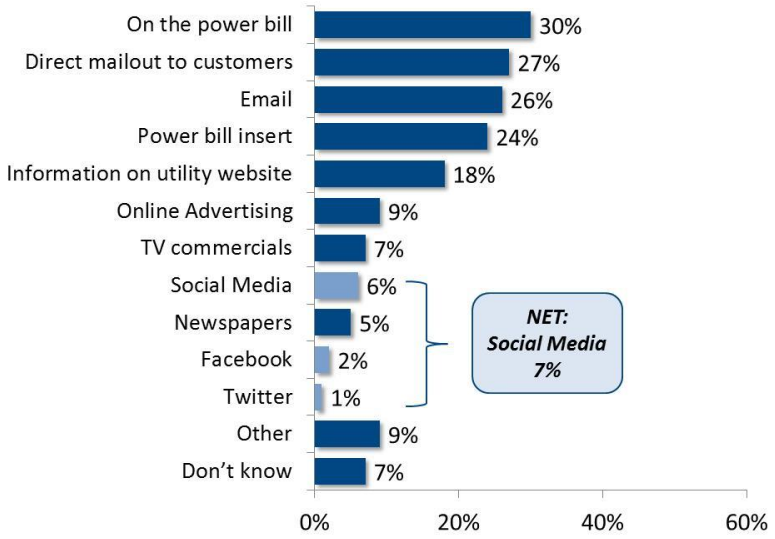
- Results show that ***power bills*** are considered a key method of communications, whether it be information on the power bill or provided as a bill insert. Indeed, more than half of residents considered the power bill (through either mode) to be the best communication method. Combined, those mentions are most prevalent among Newfoundland Power customers (59%), those with higher household incomes (63%) and among residents 55 years or older (58%).

- By contrast, a ***direct mailout*** to customers is the preferred method among NL Hydro customers (33%), females (31%) and those in lower income households (32%).

- Not surprisingly, communications preferences vary notably by age with younger residents having greater reliance on ***electronic communications***. Indeed, those aged 18-34 years are more likely than others to prefer receiving information by ***email*** (46%), via a ***utility's website*** (22%) or through ***online advertising*** (14%).

## Best Communication Mediums on Electricity Costs and Rural Rate Subsidies

**Total Unaided Mentions**

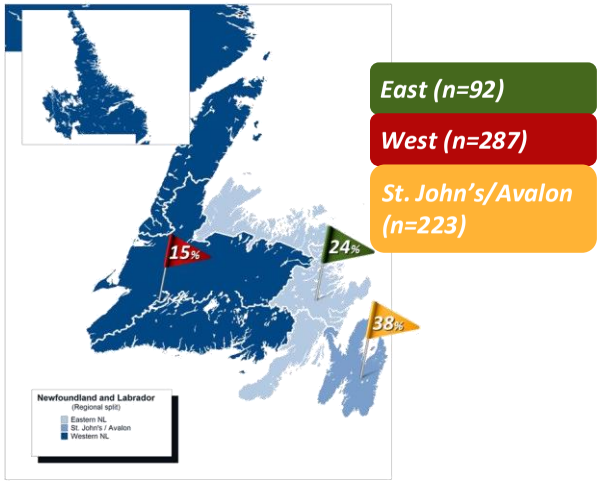



Q.9: What would be the best way for your electricity provider to provide information to customers on the topic of electricity costs and rural rate subsidies? Probe: Any other way? (n=605)

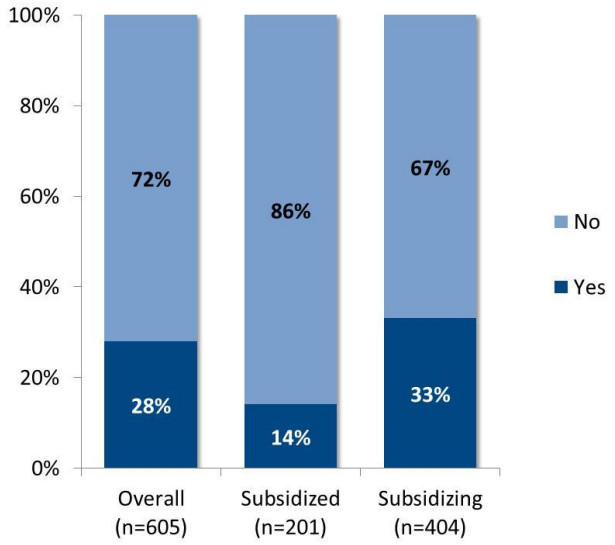
***Only a minority of electricity customers are enrolled in an equal payment plan, although incidence is higher among Newfoundland Power customers.***

- The vast majority of electricity customers in the Province are not currently on a equal payment plan. In fact, only a small minority choose to pay the same amount each month for their energy bill.
- Enrollment on a equal payment plan varies across utilities, and correspondingly, by subsidization. Newfoundland Power customers are more than twice as likely as NL Hydro customers to currently be on an equal payment plan. Accordingly, subsidizing customers are more than twice as likely as subsidized customers. Further, likelihood of being on an equal payment plan is most prevalent in the St. John's / Avalon region.

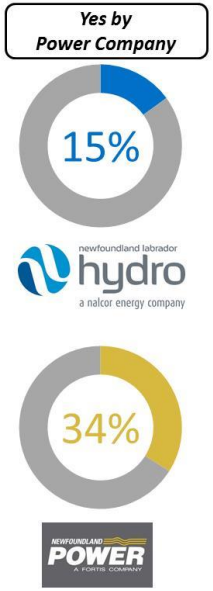
***Equal Payment Plan Incidence (by region)***




## Currently on an Equal Payment Plan




***Yes by Power Company***

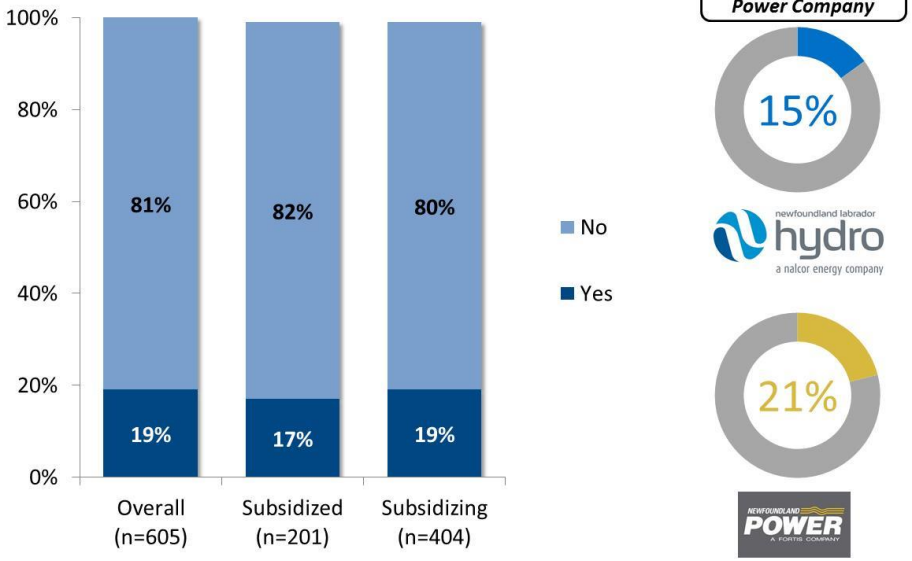



Q.10: Are you currently on an equal payment plan, where you pay the same amount each month for your energy bill?
(NL Hydro n=250, Newfoundland Power n=338)

## *Few customers are signed up for an automatic payment plan.*

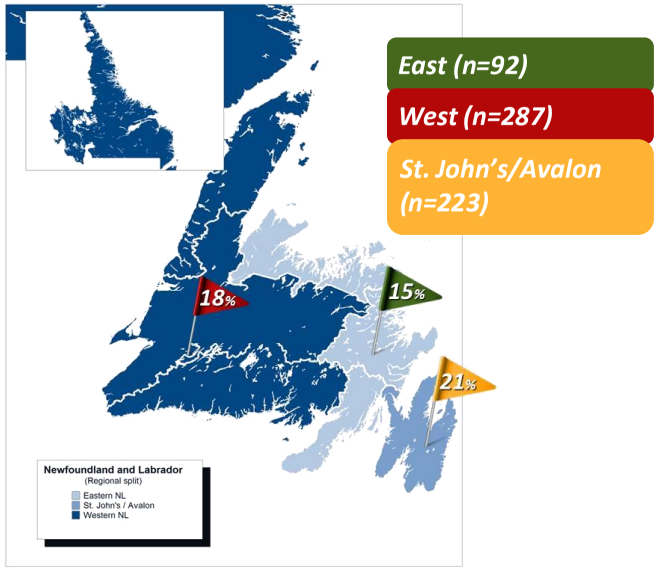
- The vast majority of electricity customers are <u>not</u> currently signed up for an automatic payment plan. In fact, only two in ten have chosen to do so. Incidence is general consistent across the Province, although customers in the St. John's / Avalon region are slightly more likely to have signed up for an automatic payment plan.
- Across utilities, Newfoundland Power customers are only slightly more likely than NL Hydro customers to have signed up for an automatic payment plan and the likelihood of having done so increases with age.

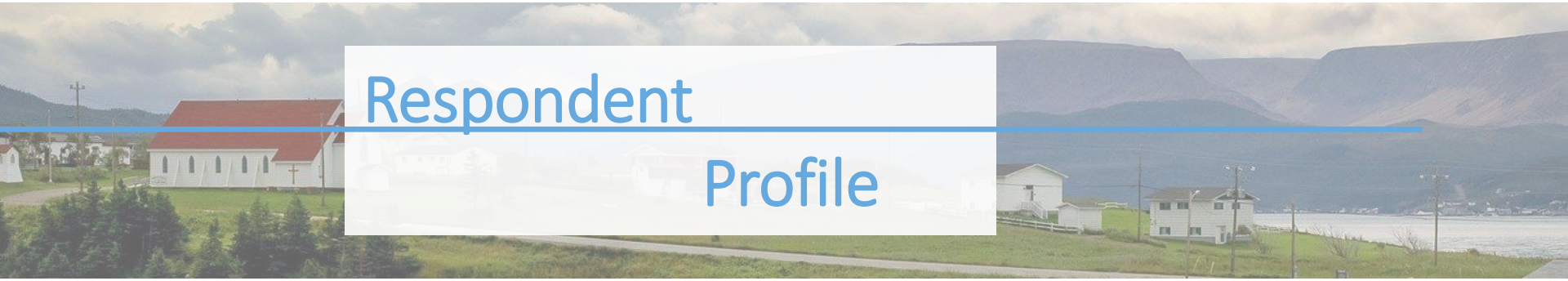
### Currently Signed Up for the Automatic Payment Plan




Q.11: Are you currently signed up for the automatic payment plan where your electricity bill is automatically deducted from your bank account each month? (NL Hydro n=250, Newfoundland Power n=338)

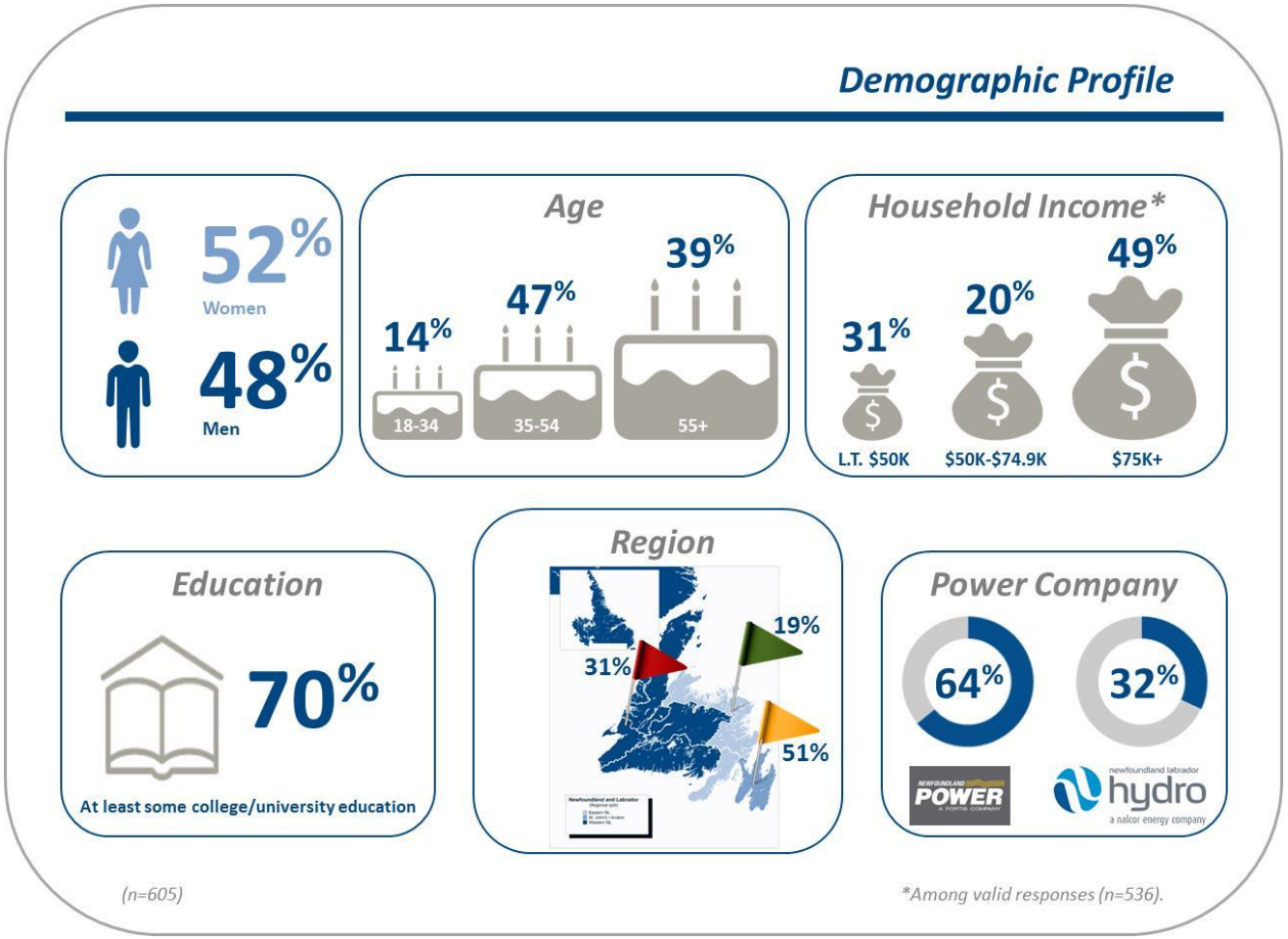
### *Automatic Payment Plan Incidence (by region)*





# Respondent Profile

- The following visually depicts the profile of survey respondents, including gender, age, household income, education, and utility.



# Exhibit 5 - Intercompany Transactions Costing Guidelines

# Intercompany Transactions Costing Guidelines

## July 2017

# Table of Contents

1.0 Purpose ..... 1
2.0 Introduction ..... 1
3.0 Costing Methods ..... 2
3.1 Type 1 – Common Service Costs ..... 2
3.1.1 Human Resources ..... 3
3.1.2 Safety and Health ..... 3
3.1.3 Environmental Services ..... 4
3.1.4 Information Systems ..... 4
3.1.5 Office Space ..... 4
3.1.6 Telephone Infrastructure (PBX) Costs ..... 4
3.2 Type 2 – Corporate Costs ..... 5
3.2.1 Employee Labour Costs ..... 5
3.2.2 Overtime ..... 5
3.2.3 Time Sheets ..... 6
3.2.4 Corporate Services ..... 6
3.2.5 Fixed Charge ..... 7
3.2.6 Materials Costs ..... 8
3.2.7 Vehicle and Other Equipment Costs ..... 8
3.2.8 Computers ..... 8
3.3 Type 3 – Cost Recovery Business Units ..... 8
4.0 Billing and Collection ..... 8

# List of Tables

Table 1 – Common Services ..... 3

## List of Schedules

Schedule I - Operating Bill Rate Components

## 1.0 Purpose

This document is intended to outline the guidelines for charging costs across the lines of business within Nalcor Energy (Nalcor or the Company).

## 2.0 Introduction

Nalcor is a Crown corporation that was established in 2007 as part of one of the key initiatives of Newfoundland and Labrador's Energy Plan. The Company, which is wholly owned by the Government of Newfoundland and Labrador, was established to take a lead role in the development of the province's energy resources. The Nalcor legal entity structure is outlined in Figure 1.

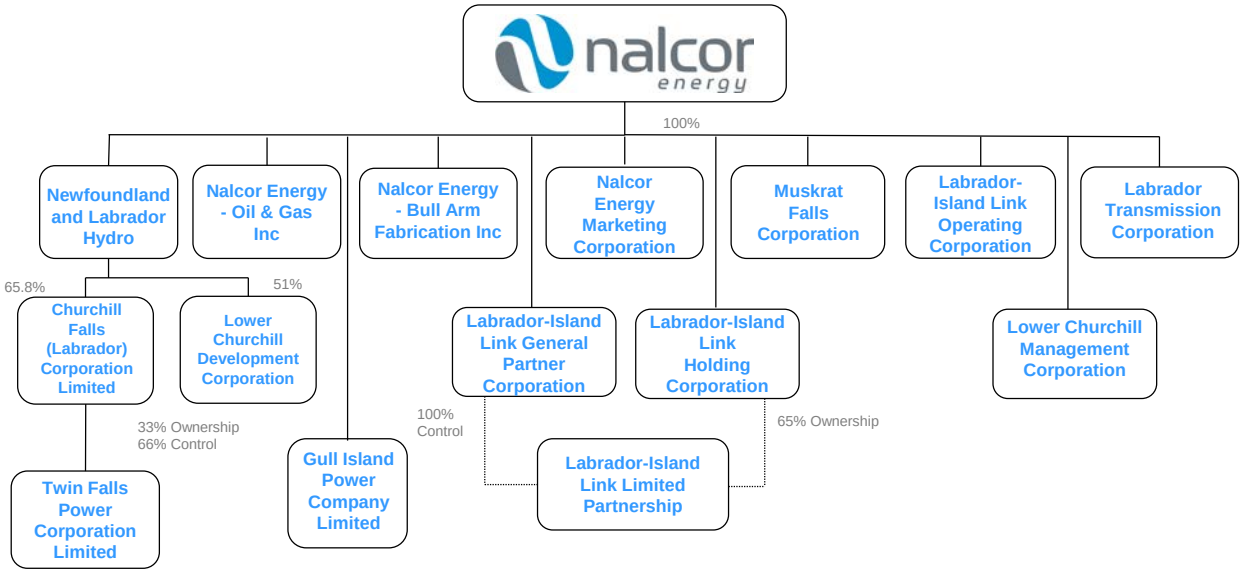



**Figure 1 – Nalcor Energy Legal Entity Structure**

Nalcor's business includes the development, generation, transmission and distribution of electricity; the exploration, development, production and sale of oil and gas; industrial fabrication and energy marketing. These intercompany transaction costing guidelines apply to both intra-company and intercompany transactions.

The guidelines are based on the principle of cost based recovery. There is no profit component and employees track time worked for other lines of business using a weekly time sheet. This results in a labour recharge which is also used in the calculation of net full time equivalents (FTEs). Costs associated with the operations of certain departments that provide common services available to all lines of business are allocated through an Administration Fee as outlined in this document. Common service business units are based in both Nalcor and Hydro.

## 3.0 Costing Methods

The costing framework used includes three primary means of charging costs among lines of business at Nalcor.

Type 1 - Common Service Costs (via Administration Fee);

Type 2 - Costs related to the provision of Corporate Services; and

Type 3 – Cost Recovery business units.

### 3.1 Type 1 – Common Service Costs

Certain functions provide common services to various lines of business. Costs are recovered through an Administration fee as described below. FTEs in common service business units are counted in the entity in which they are based, however their costs are allocated through an Administration Fee.

**Table 1 – Common Services**

| Common Service Departments | Allocation Basis | Entity |
|---|---|---|
| Human Resources | FTE | Nalcor |
| Safety and Health | FTE | Nalcor |
| Environment | FTE | Nalcor |
| Information Systems (IS) | Average Users[1] | Nalcor |
| Hydro Place office space and related costs | Square footage | Hydro |
| Telephone and Local Area Network (LAN) costs | Users | Hydro |

### 3.1.1 Human Resources

Human Resources provides service to all lines of business in the areas of:

- Payroll;
- Human Resources Systems;
- Pension administration;
- Employee recognition programs;
- Administration of the performance management system;
- Maintenance of the human resources database.

Operating costs incurred in providing Human Resources services in the common service business unit are allocated to the lines of business on a FTE basis.

### 3.1.2 Safety and Health

The Safety and Health department provides Occupational Health services including coordinating corporate efforts with regard to employee safety and wellness. Operating costs incurred in providing safety and health services are allocated to the lines of business on a FTE basis.

[1] Average users is the average of the number of FTEs and contractors, Lotus Notes mail boxes, number of computers and JDE Users.

### 3.1.3 Environmental Services

The Environment department coordinates corporate efforts with regard to environmental stewardship. Operating costs incurred in providing environmental oversight services are allocated to the lines of business on a FTE basis.

### 3.1.4 Information Systems

Information Systems (IS) provides assistance and support in the areas of software applications, planning and integration and business solutions. This department is also responsible for the maintenance and administration of the company-wide computer infrastructure and provides technical support. Operating costs incurred in providing IS services are allocated to the lines of business on an average user basis. Depreciation expenses and a return on rate base at the weighted average cost of capital (WACC) for costs capitalized such as servers and software are allocated to each line of business on an average user basis. Costs that are incurred solely for a particular line of business, rather than shared among the lines of business are charged to that line of business and are excluded from the determination of shared costs.

### 3.1.5 Office Space

Each line of business occupying floor space at Hydro Place is charged a rental charge for floor space. The square footage rental rate reflects the average annual capital and operating cost for Hydro Place as determined by the following formula:

$$\frac{\text{Hydro Place operating costs + return on rate base + annual depreciation}}{\text{Hydro Place total square footage}}$$

### 3.1.6 Telephone Infrastructure (PBX) Costs

All lines of business are charged their share of Telephone Infrastructure (PBX) costs including long distance charges. The Local Area Network (LAN) costs provided by Network Services are divided by the total number of LAN ports to derive a cost per user. The telephone costs

provided by Network Services are divided by the number of telephone, fax, and modem lines to derive a cost per telephone.

### 3.2 Type 2 – Corporate Costs

Certain departments provide corporate services (or shared services) to other lines of business within Nalcor. These services include management, general accounting, treasury, purchasing, legal, human resources, safety and health, engineering services and administration. Transactions associated with these services are governed by these guidelines. Intercompany transactions operate on the premise that all transactions are billed at cost. Corporate costs incurred within various lines of business are charged to the appropriate line of business as described below.

#### 3.2.1 Employee Labour Costs

All employees of Nalcor are required to charge time by completing time sheets which allocate labour to work orders based on activity. The guiding principle is that where an employee spends time on specific tasks and work activities for another entity or line of business, time is to be charged at cost. Cost, or the bill rate, is defined as labour costs, fringe benefits (including time off) and other direct costs. See Schedule I for a detailed listing of the components of the bill rate. The operating bill rates are reviewed annually and updated as required. Labour hours that are recharged through this process are used in the calculation of net FTEs.

#### 3.2.2 Overtime

Overtime will be charged as incurred in accordance with the overtime policy and no additional mark-up or fixed charge is applied.

### 3.2.3 Time Sheets

All employees are required to complete weekly time sheets. All work hours must be coded to work orders in order to adequately track hours to the appropriate business unit. Time is coded in 30 minute increments.

### 3.2.4 Corporate Services

The functions and departments that may share services across entities include:

**a) Leadership Team[2]**

Executive management provides strategic oversight and general management.

**b) Legal**

General Counsel's responsibilities include the provision of legal and corporate secretary services.

**c) Internal Audit**

The Internal Audit department provides auditing services as determined in an annual audit plan as part of the annual update of the Five-Year Internal Audit Plan.

**d) Engineering Services**

This division provides services in all engineering disciplines and covers such items as:

a) Design, construction and project management;

b) Engineering studies, technical specifications and construction coordination;

c) Tender preparation and analysis including interaction with consultants; and

d) Review and resolution of maintenance problems.

**e) Environmental Services**

The Environmental Services department's activities include auditing for compliance with government regulations and corporate policy, obtaining permits and approvals for proposed programs and advising on environmental matters.

[2] Excludes Hydro as Hydro has a separate Leadership team that supports Hydro only.

**f) Financial Planning**

The Investment Evaluation department provides services to facilitate the production, review and distribution of annual long-term financial plans. As well, they provide financial planning and analyses for various activities and scenarios.

**h) Risk and Insurance**

The Risk and Insurance department provides services related to the placement, policy and claims administration, risk control and risk financing of the corporate insurance program.

**i) Finance**

The Finance department provides accounting and treasury services.

**j) Supply Chain Management**

The Supply Chain Management department coordinates all efforts related to procurement process activities including tendering, purchasing and contract administration.

### 3.2.5 Fixed Charge

In addition to labour costs, a fixed rate will be applied to each hour of regular labour charged to lines of business. The fixed charge accounts for the additional cost, beyond basic salary and benefit costs, of having an employee available to provide service. The fixed charge recovers costs originally charged in the Administration Fee as well as other employee related costs, including:

- Telephone and fax;
- Books and subscriptions;
- Membership fees and dues;
- Conferences;
- Training; and
- Employee expenses (e.g. overtime meal allowance).

While most employees who provide intercompany services are located in Hydro Place, this rate will also be used as a proxy for employees working from other locations.

The fixed charge rate is reviewed annually and updated accordingly.

### 3.2.6 Materials Costs

Materials issued from inventory will be charged at cost to the applicable line of business.

### 3.2.7 Vehicle and Other Equipment Costs

Vehicles utilized across lines of business will be charged a rental rate which is based upon the type of vehicle utilized. The rental charge is calculated by multiplying the usage time by the daily or hourly rental rate for the applicable vehicle. The rental rates are updated annually.

### 3.2.8 Computers

Computer purchases are charged directly to the applicable line of business.

### 3.3 Type 3 – Cost Recovery Business Units

Certain functions incur costs on a cost recovery basis. In these cases, all costs associated with the activity are charged in accordance with the applicable cost recovery arrangements.

## 4.0 Billing and Collection

Invoices for the recovery of intercompany transactions are to be issued on a monthly basis. Billings to and from related entities shall be undertaken within 30 days of the end of the month in which the service, resource or asset is provided. Receivables between related companies are paid upon invoice receipt from a related entity. If the invoice is not paid in full within 30 days from the date of invoice, Finance will calculate an intercompany interest charge. The amount of the charge will be such that there is no net financing impact on the Company to which the balance is owed. Finance charges are calculated by applying a rate to the intercompany balance(s) that is equal to the cost of short-term financing for the Company to which the balance is owed. If the Company to which the balance is owed is Hydro, then the rate applied to such balances is the last approved WACC, which is currently 6.61% (2013 Amended GRA).

# Exhibit 5 - Schedule I

# Operating Bill Rate Components

**Operating Bill Rate Components**

Components of the operating bill rate are as follows:

- Salary Cost Components:
  - Salaries & Temporary Salaries including the payroll code for Easeback/Return to Work
  - Other Salary Costs - Retroactive Pay

- Mark Up Components:
  - Fringe Benefit Costs
    - Canada Pension Plan
    - Employment Insurance
    - Public Service Pension Plan
    - Group Money Purchase Plan
    - Prior Service Matched PSPP
    - Workplace Health Safety and Compensation Premiums
  - Insurances:
    - Life Insurances
    - A D&D Insurance
    - Medical Insurance
    - Dental Insurance
  - Company Costs:
    - Employee Future Benefits expense
    - Payroll Taxes
    - Other Salary Costs - Bonus, Performance Contracts & Signing Bonus
  - Leave:
    - All paid leave types.

**Exhibit 6 – Capital Expenditures and Carryover Reports**

A REPORT TO
THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

# CAPITAL EXPENDITURES AND CARRYOVER REPORT

## For Year Ending December 31, 2015

**March 2016**

newfoundland labrador hydro
a nalcor energy company

# NEWFOUNDLAND AND LABRADOR HYDRO
# CAPITAL EXPENDITURES AND CARRYOVER REPORT
## For Year Ending December 31, 2015

## TABLE OF CONTENTS

CAPITAL BUDGET OVERVIEW ..... 1

CAPITAL EXPENDITURES BY YEAR ..... 2

CAPITAL EXPENDITURES BY CATEGORY ..... 3

VARIANCE EXPLANATIONS (GREATER THAN $100,000 and 10% Variance from Budget): ..... 17

CAPITAL BUDGET VERSUS ACTUAL EXPENDITURES 2006 - 2015 ..... 32

CARRYOVER REPORT ..... 33

REMOVE SAFETY HAZARDS ..... 35

# Total Capital Project Variance
# 2015 Overview
# ($000)

| Asset Type | Board Approved Budget | Total Project Expenditures and Forecast | Variance |
|---|---|---|---|
| HYDRAULIC | 14,243.1 | 13,558.6 | (684.5) |
| THERMAL | 9,953.5 | 10,740.1 | 786.6 |
| GAS TURBINES | 6,855.0 | 6,905.9 | 50.9 |
| TERMINAL STATIONS | 42,910.1 | 43,223.2 | 313.1 |
| TRANSMISSION | 5,010.5 | 5,238.4 | 227.9 |
| DISTRIBUTION | 31,384.6 | 29,862.3 | (1,522.3) |
| RURAL GENERATION | 25,574.3 | 23,121.4 | (2,452.9) |
| PROPERTIES | 3,312.8 | 3,230.4 | (82.4) |
| METERING | 2,054.0 | 2,010.4 | (43.6) |
| RURAL SYSTEMS TOOLS AND EQUIPMENT | 2,069.3 | 1,871.5 | (197.8) |
| INFORMATION SYSTEMS | 3,391.6 | 3,519.0 | 127.4 |
| TELECONTROL | 1,794.2 | 1,813.1 | 18.9 |
| TRANSPORTATION | 5,502.5 | 5,419.0 | (83.5) |
| ADMINISTRATIVE | 1,549.6 | 1,372.7 | (176.9) |
| ALLOWANCE FOR UNFORESEEN | 1,250.0 | 945.1 | (304.9) |
| SUPPLEMENTAL PROJECTS | 773,585.1 | 462,469.7 | (311,115.4) |
| PROJECTS APPROVED FOR LESS THAN $50,000 | 554.5 | 493.2 | (61.3) |
| **TOTAL CAPITAL BUDGET** | **930,994.7** | **615,794.0** | **(315,200.7)** |

## 2015 Capital Expenditures By Year ($000)

| Summary | Capital Budget[1] | | | | | | | | | | Actual Expenditure and Forecast | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | | | B | C | D (B+C) | E | F (A+C+E) | G | | | | | H | I | J | K (G+H+I+J) | K-F | H-D |
| | 2010 | 2011 | 2012 | 2013 | 2014 | Carryover 2015 | Original 2015[3] | Revised 2015[3] | 2016 and Beyond | Total | 2010 | 2011 | 2012 | 2013 | 2014[2] | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance |
| 2015 Projects | | | | | | | 65,471.2 | 65,471.2 | 29,309.7 | 94,780.9 | | | | | | 55,850.2 | 29,269.4 | 4,792.1 | 89,911.7 | (4,869.2) | (9,621.0) |
| 2014 Projects | | | | | 173,298.2 | 25,576.1 | 207,102.1 | 232,678.2 | 399,524.0 | 779,924.3 | | | | | 119,176.6 | 55,028.4 | 289,475.7 | 3,324.3 | 467,005.0 | (312,919.3) | (177,649.8) |
| 2013 Projects | | | | 8,851.1 | 29,588.6 | 10,030.9 | 836.1 | 10,867.0 | 1,983.5 | 41,259.3 | | | 76.6 | 2,505.4 | 26,816.5 | 12,157.1 | 1,983.5 | 183.1 | 43,722.2 | 2,462.9 | 1,290.1 |
| 2012 Projects | | | 110.4 | - | - | - | - | - | - | 110.4 | | | 43.6 | 69.2 | - | - | - | - | 112.8 | 2.4 | - |
| 2011 Projects | | 750.7 | 704.3 | 720.0 | 738.9 | 798.1 | 758.5 | 1,556.6 | - | 3,672.4 | | 391.1 | 332.4 | 657.0 | 735.3 | 1,228.8 | - | - | 3,344.6 | (327.8) | (327.8) |
| 2010 Projects | 1,088.9 | 3,501.2 | 3,840.7 | 969.5 | 608.9 | (634.5) | 1,238.2 | 603.7 | - | 11,247.4 | 1,524.6 | 2,825.0 | 4,120.6 | 1,129.8 | 1,243.4 | 854.3 | - | - | 11,697.7 | 450.3 | 250.6 |
| **Grand Total** | 1,088.9 | 4,251.9 | 4,655.4 | 10,540.6 | 204,234.6 | 35,770.6 | 275,406.1 | 311,176.7 | 430,817.2 | 930,994.7 | 1,524.6 | 3,216.1 | 4,573.2 | 4,361.4 | 147,971.8 | 125,118.8 | 320,728.6 | 8,299.5 | 615,794.0 | (315,200.7) | (186,057.9) |

| | |
|---|---|
| 2015 Capital Budget Approved by Board Order No. P.U. 50(2014) | 76,832.9 |
| New Project Approved by Board Order No. 16(2014) | 9,248.8 |
| New Project Approved by Board Order No. 29(2014) | 1,226.4 |
| New Project Approved by Board Order No. 34(2014) | 360.0 |
| New Project Approved by Board Order No. 38(2014) | 61.1 |
| New Project Approved by Board Order No. 45(2014)[3] | 1,238.2 |
| New Project Approved by Board Order No. 53(2014) | 18,964.7 |
| New Project Approved by (O.C. 2014-033)[4] | 163,145.3 |
| New Project Approved by Board Order No. 24(2015) | 1,536.3 |
| New Project Approved by Board Order No. 27(2015) | 327.9 |
| New Project Approved by Board Order No. 29(2015) | 1,249.3 |
| New Project Approved by Board Order No. 31(2015) | 500.1 |
| New Project Approved by Board Order No. 34(2015) | 250.0 |
| 2015 New Projects under $50,000 Approved by Hydro | 465.1 |
| Total Approved Capital Budget Before Carryovers | 275,406.1 |
| Carryovers from 2014 to 2015 | 35,770.6 |
| TOTAL APPROVED CAPITAL BUDGET | 311,176.7 |

[1] Annual budgets previous to 2015 pertain to projects that have expenditures in 2015.

[2] Includes Insurance Proceeds relating to Sunnyside - Transformer T1 Replacement ($1.8M).

[3] As per Board Order No. P.U. 45(2014) the Board did not approve the $0.2M Voltage Conversion - Labrador City actual costs over budget from 2010 to 2013. Hydro has excluded the $0.2M from average rate base.

[4] The construction of the Labrador West Transmission was approved by OC2014-033, February 2, 2014 of which $163.1M was included in the 2015 Capital Budget. The capital expenditures associated with this project are $11.6M as at December 31, 2015 and are included in Work In Progress and as a result are currently excluded from average rate base. The costs to be included in rate base will be subject to review by the Board of Commissioners of Public Utilities.

## 2015 Capital Expenditures By Category ($000)

| Hydraulic Generation Projects | Capital Budget | | | | | | | | Actual Expenditure and Forecast | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | B | C | D (B+C) | E | F (A+C+E) | G | | | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2012 | 2013 | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2012 | 2013 | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | | | | | |
| Refurbish Unit Relay Protection - Paradise River | - | - | - | - | 8.7 | 8.7 | 79.7 | 88.4 | - | - | - | 9.0 | 79.7 | (0.3) | 88.4 | - | 0.3 | |
| Refurbish Generation Unit - Snook's Arm | - | - | - | - | 352.9 | 352.9 | - | 352.9 | - | - | - | 315.0 | - | - | 315.0 | (37.9) | (37.9) | |
| Replace Station Service Breakers - Cat Arm | - | - | - | - | 644.9 | 644.9 | 363.4 | 1,008.3 | - | - | - | 646.1 | 363.4 | (1.2) | 1,008.3 | - | 1.2 | |
| Refurbish Access Road - Cat Arm | - | - | - | - | 990.0 | 990.0 | - | 990.0 | - | - | - | 939.8 | - | - | 939.8 | (50.2) | (50.2) | |
| Replace ABB Exciter Unit 2 - Cat Arm | - | - | - | - | 845.9 | 845.9 | - | 845.9 | - | - | - | 680.8 | - | - | 680.8 | (165.1) | (165.1) | 1 |
| Replace Interior Coating on Surge Tank 3 - Bay d'Espoir | - | - | - | - | 1,629.3 | 1,629.3 | - | 1,629.3 | - | - | - | 1,262.7 | - | - | 1,262.7 | (366.6) | (366.6) | 2 |
| Rehabilitate Salmon River Spillway - Bay d'Espoir | - | - | - | - | 745.6 | 745.6 | 556.8 | 1,302.4 | - | - | - | 522.9 | 556.8 | 222.7 | 1,302.4 | - | (222.7) | 3 |
| Upgrade Generator Bearings Units 1 and 3 - Bay d'Espoir | - | - | - | - | 14.7 | 14.7 | 633.3 | 648.0 | - | - | - | 8.1 | 633.3 | 6.6 | 648.0 | - | (6.6) | |
| Automate Generator Deluge Systems - Bay d'Espoir | - | - | - | - | 645.2 | 645.2 | - | 645.2 | - | - | - | 567.9 | - | - | 567.9 | (77.3) | (77.3) | |
| Replace Pump House and Associated Equipment - Bay d'Espoir | - | - | - | - | 22.7 | 22.7 | 522.5 | 545.2 | - | - | - | 137.0 | 522.5 | (114.3) | 545.2 | - | 114.3 | 4 |
| Upgrade Public Safety Around Dams and Waterways - Various Sites | - | - | - | - | 483.9 | 483.9 | - | 483.9 | - | - | - | 468.7 | - | - | 468.7 | (15.2) | (15.2) | |
| Install Hydrometeorological Stations - Various Sites | - | - | - | - | 377.9 | 377.9 | - | 377.9 | - | - | - | 372.2 | - | - | 372.2 | (5.7) | (5.7) | |
| Upgrade Equipment Doors - Various Sites | - | - | - | - | 348.5 | 348.5 | - | 348.5 | - | - | - | 285.4 | - | 63.1 | 348.5 | - | (63.1) | |
| Refurbish Intakes - Bay d'Espoir | - | - | - | - | 72.6 | 72.6 | 262.3 | 334.9 | - | - | - | 26.4 | 262.3 | 46.2 | 334.9 | - | (46.2) | |
| Replace Automatic Greasing Systems Units 2 and 4 - Bay d'Espoir | - | - | - | - | 254.4 | 254.4 | - | 254.4 | - | - | - | 231.5 | - | - | 231.5 | (22.9) | (22.9) | |
| Install Infrared View Ports - Various Sites | - | - | - | - | 83.7 | 83.7 | 113.1 | 196.8 | - | - | - | 54.7 | 113.1 | 29.0 | 196.8 | - | (29.0) | |
| Replace Generator Bearing Coolers - Bay d'Espoir | - | - | - | - | 153.8 | 153.8 | - | 153.8 | - | - | - | 132.2 | - | - | 132.2 | (21.6) | (21.6) | |
| Overhaul Turbine/Generator Units - Bay d'Espoir and Paradise River | - | - | - | - | 304.4 | 304.4 | - | 304.4 | - | - | - | 325.8 | - | - | 325.8 | 21.4 | 21.4 | |
| Purchase Tools and Equipment Less than $50,000 | - | - | - | - | 108.6 | 108.6 | - | 108.6 | - | - | - | 75.2 | - | - | 75.2 | (33.4) | (33.4) | |
| 2014 Projects | | | | | | | | | | | | | | | | | | |
| Upgrade Burnt Dam Spillway - Bay d'Espoir | - | - | 110.2 | (15.9) | 1,201.9 | 1,186.0 | - | 1,312.1 | - | - | 126.1 | 640.2 | - | 545.8 | 1,312.1 | - | (545.8) | 5 |
| Upgrade Victoria Control Structure - Bay d'Espoir | - | - | 495.1 | 415.5 | - | 415.5 | - | 495.1 | - | - | 79.6 | 235.0 | - | 180.5 | 495.1 | - | (180.5) | 6 |
| Upgrade Generator Bearings Unit 2 - Bay d'Espoir | - | - | 18.9 | 9.5 | 396.0 | 405.5 | - | 414.9 | - | - | 9.4 | 252.8 | - | - | 262.2 | (152.7) | (152.7) | 7 |
| Replace Spherical By Pass Valve Assemblies Units 1 and 2 - Bay d'Espoir | - | - | 57.5 | 44.7 | 96.3 | 141.0 | - | 153.8 | - | - | 12.8 | 169.5 | - | 53.5 | 235.8 | 82.0 | 28.5 | |
| Install Handheld Pendant to Overhead Crane - Bay d'Espoir | - | - | 49.9 | 4.9 | 170.8 | 175.7 | - | 220.7 | - | - | 45.0 | 19.3 | - | 156.4 | 220.7 | - | (156.4) | 8 |
| 2013 Projects | | | | | | | | | | | | | | | | | | |
| Upgrade Units 1 to 6 By-Pass Valves - Bay d'Espoir | - | 141.9 | - | (43.1) | - | (43.1) | - | 141.9 | 3.0 | 9.5 | 172.5 | 35.5 | - | - | 220.5 | 78.6 | 78.6 | |
| Upgrade Burnt Dam Spillway - Bay d'Espoir | - | 885.8 | - | 12.3 | - | 12.3 | - | 885.8 | 15.0 | 223.1 | 635.4 | 94.4 | - | - | 967.9 | 82.1 | 82.1 | |
| **Total Hydraulic Generation Projects** | - | 1,027.7 | 731.6 | 427.9 | 9,952.7 | 10,380.6 | 2,531.1 | 14,243.1 | 18.0 | 232.6 | 1,080.8 | 8,508.1 | 2,531.1 | 1,188.0 | 13,558.6 | (684.5) | (1,872.5) | |

## 2015 Capital Expenditures By Category ($000)

| Thermal Generation Projects | Capital Budget | | | | | | | | Actual Expenditure and Forecast | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | B | C | D (B+C) | E | F (A+C+E) | G | | | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2012 | 2013 | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2012 | 2013 | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | | | | | |
| Overhaul Turbine Valves Unit 1 - Holyrood | - | - | - | - | 1,577.5 | 1,577.5 | - | 1,577.5 | - | - | - | 1,707.6 | - | - | 1,707.6 | 130.1 | 130.1 | |
| Overhaul Boiler Feed Pump East Unit 1 - Holyrood | - | - | - | - | 196.3 | 196.3 | - | 196.3 | - | - | - | 215.2 | - | - | 215.2 | 18.9 | 18.9 | |
| Replace DC Distribution Panels and Breakers - Holyrood | - | - | - | - | 127.9 | 127.9 | - | 127.9 | - | - | - | 131.5 | - | - | 131.5 | 3.6 | 3.6 | |
| Upgrade Powerhouse Roofing - Holyrood | - | - | - | - | 1,047.8 | 1,047.8 | - | 1,047.8 | - | - | - | 802.9 | - | 244.9 | 1,047.8 | - | (244.9) | 9 |
| Upgrade Quarry Brook Dam Equipment - Holyrood | - | - | - | - | 498.7 | 498.7 | - | 498.7 | - | - | - | 490.9 | - | - | 490.9 | (7.8) | (7.8) | |
| Upgrade Fire Protection (Main Warehouse) - Holyrood | - | - | - | - | 46.2 | 46.2 | 197.6 | 243.8 | - | - | - | 76.4 | 197.6 | (30.2) | 243.8 | - | 30.2 | |
| Overhaul Extraction Pumps - Holyrood | - | - | - | - | 189.6 | 189.6 | - | 189.6 | - | - | - | 192.5 | - | - | 192.5 | 2.9 | 2.9 | |
| Purchase Tools and Equipment Less than $50,000 | - | - | - | - | 15.7 | 15.7 | - | 15.7 | - | - | - | 15.5 | - | - | 15.5 | (0.2) | (0.2) | |
| 2014 Projects | | | | | | | | | | | | | | | | | | |
| Replace Economizer Inlet Valves - Holyrood | - | - | 192.0 | 58.4 | 329.1 | 387.5 | - | 521.1 | - | - | 133.6 | 409.1 | - | - | 542.7 | 21.6 | 21.6 | |
| Install Cold-Reheat Condensate Drains and High Pressure Heater Trip Level Unit 3 - Holyrood | - | - | 49.8 | (51.5) | 467.4 | 415.9 | - | 517.2 | - | - | 101.3 | 453.9 | - | - | 555.2 | 38.0 | 38.0 | |
| Upgrade Plant Elevators - Holyrood | - | - | 533.2 | (46.7) | - | (46.7) | - | 533.2 | - | - | 579.9 | 309.3 | - | - | 889.2 | 356.0 | 356.0 | 10 |
| Upgrade Vibration Monitoring System - Holyrood | - | - | 524.9 | 48.1 | - | 48.1 | - | 524.9 | - | - | 476.8 | 31.7 | - | - | 508.5 | (16.4) | (16.4) | |
| Install Fire Protection Upgrades - Holyrood | - | - | 56.6 | (255.4) | 312.5 | 57.1 | - | 369.1 | - | - | 312.0 | 20.6 | - | - | 332.6 | (36.5) | (36.5) | |
| Replace DC Distribution Panels and Breakers - Holyrood | - | - | 174.2 | 148.6 | - | 148.6 | - | 174.2 | - | - | 25.6 | 159.7 | - | - | 185.3 | 11.1 | 11.1 | |
| Purchase Tools and Equipment Less than $50,000 | - | - | 59.2 | 15.1 | - | 15.1 | - | 59.2 | - | - | 37.7 | 11.8 | - | - | 49.5 | (9.7) | (3.3) | |
| 2013 Projects | | | | | | | | | | | | | | | | | | |
| Install Variable Frequency Drives on Forced Draft Fans - Holyrood | - | 697.6 | 2,659.7 | 390.7 | - | 390.7 | - | 3,357.3 | 13.8 | 206.0 | 2,746.8 | 665.7 | - | - | 3,632.3 | 275.0 | 275.0 | 11 |
| **Total Thermal Generation Projects** | - | 697.6 | 4,249.6 | 307.3 | 4,808.7 | 5,116.0 | 197.6 | 9,953.5 | 13.8 | 206.0 | 4,413.7 | 5,694.3 | 197.6 | 214.7 | 10,740.1 | 786.6 | 578.3 | |

## 2015 Capital Expenditures By Category ($000)

| Gas Turbine Generation Projects | Capital Budget | | | | | | | | Actual Expenditure and Forecast | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | B | C | D (B+C) | E | F (A+C+E) | G | | | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2012 | 2013 | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2012 | 2013 | 2014 | 2015 | 2016 and Beyond | Carryover to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | | | | | |
| Upgrade Gas Turbine Plant Life Extension - Stephenville | - | - | - | - | 2,655.2 | 2,655.2 | 2,525.4 | 5,180.6 | - | - | - | 2,613.6 | 2,525.4 | 41.6 | 5,180.6 | - | (41.6) | |
| Replace Alternator Shaft - Happy Valley | - | - | - | - | 484.4 | 484.4 | - | 484.4 | - | - | - | 131.1 | - | 320.0 | 451.1 | (33.3) | (353.3) | 12 |
| 2013 Projects | | | | | | | | | | | | | | | | | | |
| Upgrade Gas Turbine PLC - Happy Valley | - | 61.4 | 1,128.6 | 734.2 | - | 734.2 | - | 1,190.0 | 2.3 | 22.6 | 430.9 | 818.4 | - | - | 1,274.2 | 84.2 | 84.2 | |
| **Total Gas Turbine Generation Projects** | - | 61.4 | 1,128.6 | 734.2 | 3,139.6 | 3,873.8 | 2,525.4 | 6,855.0 | 2.3 | 22.6 | 430.9 | 3,563.1 | 2,525.4 | 361.6 | 6,905.9 | 50.9 | (310.7) | |

## 2015 Capital Expenditures By Category ($000)

| Terminal Stations Projects | Capital Budget | | | | | | | | | Actual Expenditure and Forecast | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | | B | C | D (B+C) | E | F (A+C+E) | G | | | | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2011 | 2012 | 2013 | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | | | | | | | |
| Upgrade Circuit Breakers - Various Sites (2015-2016) | - | - | - | - | - | 6,189.1 | 6,189.1 | 6,873.8 | 13,062.9 | - | - | - | - | 7,570.4 | 6,873.8 | (1,381.3) | 13,062.9 | - | 1,381.3 | 13 |
| Replace Surge Arrestors - Various Sites | - | - | - | - | - | 198.1 | 198.1 | - | 198.1 | - | - | - | - | 172.2 | - | - | 172.2 | (25.9) | (25.9) | |
| Install Transformer On line Gas Monitoring - Various Sites | - | - | - | - | - | 700.5 | 700.5 | 975.7 | 1,676.2 | - | - | - | - | 786.5 | 975.7 | (86.0) | 1,676.2 | - | 86.0 | |
| Upgrade Power Transformers - Various Sites | - | - | - | - | - | 4,440.4 | 4,440.4 | 7,002.3 | 11,442.7 | - | - | - | - | 2,357.3 | 7,002.3 | 2,083.1 | 11,442.7 | - | (2,083.1) | 14 |
| Replace Disconnect Switches - Various Sites (2015-2016) | - | - | - | - | - | 963.7 | 963.7 | 642.9 | 1,606.6 | - | - | - | - | 563.1 | 642.9 | 400.6 | 1,606.6 | - | (400.6) | 15 |
| Design and Install Fire Protection in 230 kV Station - Various Sites | - | - | - | - | - | 67.6 | 67.6 | 424.3 | 491.9 | - | - | - | - | 74.9 | 424.3 | (7.3) | 491.9 | - | 7.3 | |
| Perform Site Work for Mobile Substation - Barachoix | - | - | - | - | - | 489.3 | 489.3 | - | 489.3 | - | - | - | - | 516.5 | - | - | 516.5 | 27.2 | 27.2 | |
| Upgrade Terminal Station Protection and Control - Various Sites | - | - | - | - | - | 172.7 | 172.7 | 307.2 | 479.9 | - | - | - | - | 162.5 | 307.2 | 10.2 | 479.9 | - | (10.2) | |
| Upgrade Terminal Station Foundations - Various Sites | - | - | - | - | - | 302.3 | 302.3 | - | 302.3 | - | - | - | - | 313.1 | - | - | 313.1 | 10.8 | 10.8 | |
| Upgrade Control Wiring Phase 1 to Terminal Station 1 - Bay d'Espoir | - | - | - | - | - | 301.0 | 301.0 | - | 301.0 | - | - | - | - | 336.3 | - | - | 336.3 | 35.3 | 35.3 | |
| Install Support Structures C2 Capacitor Bank - Hardwoods | - | - | - | - | - | 199.3 | 199.3 | - | 199.3 | - | - | - | - | 58.0 | - | 26.4 | 84.4 | (114.9) | (141.3) | 16 |
| Replace Station Lighting - Bay d'Espoir | - | - | - | - | - | 16.7 | 16.7 | 160.3 | 177.0 | - | - | - | - | 20.0 | 160.3 | (3.3) | 177.0 | - | 3.3 | |
| Upgrade Transformer Differential Protection - Grandy Brook | - | - | - | - | - | 154.0 | 154.0 | - | 154.0 | - | - | - | - | 75.0 | - | - | 75.0 | (79.0) | (79.0) | |
| 2014 Projects | | | | | | | | | | | | | | | | | | | | |
| Upgrade Circuit Breakers - Various Sites | - | - | - | 3,695.4 | 2,123.7 | 1,642.5 | 3,766.2 | - | 5,337.9 | - | - | - | 1,571.7 | 4,167.5 | - | - | 5,739.2 | 401.3 | 401.3 | 17 |
| Replace Disconnect Switches - Various Sites | - | - | - | 815.9 | 667.5 | 189.5 | 857.0 | - | 1,005.4 | - | - | - | 148.4 | 939.7 | - | - | 1,088.1 | 82.7 | 82.7 | |
| Replace Optimho Relays on TL203 - Western Avalon to Sunnyside | - | - | - | 89.1 | 70.9 | 96.9 | 167.8 | - | 186.0 | - | - | - | 18.2 | 200.7 | - | - | 218.9 | 32.9 | 32.9 | |
| 2013 Projects | | | | | | | | | | | | | | | | | | | | |
| Replace Instrument Transformers - Various Sites | - | - | 593.2 | 552.8 | 206.7 | 538.4 | 745.1 | 1,983.5 | 3,667.9 | - | 9.6 | 230.7 | 699.0 | 755.5 | 1,983.5 | (10.4) | 3,667.9 | - | 10.4 | |
| Replace Insulators - Various Sites | - | - | 187.1 | 287.9 | 41.6 | - | 41.6 | - | 475.0 | - | 5.1 | 67.0 | 361.3 | 68.0 | - | - | 501.4 | 26.4 | 26.4 | |
| 2011 Projects | | | | | | | | | | | | | | | | | | | | |
| Perform Grounding Upgrades - Various Sites | 321.2 | 324.0 | 329.0 | 337.1 | 51.8 | 345.4 | 397.2 | - | 1,656.7 | 287.6 | 240.7 | 507.2 | 224.0 | 313.5 | - | - | 1,573.0 | (83.7) | (83.7) | |
| **Total Terminal Stations Projects** | 321.2 | 324.0 | 1,109.3 | 5,778.2 | 3,162.2 | 17,007.4 | 20,169.6 | 18,370.0 | 42,910.1 | 287.6 | 255.4 | 804.9 | 3,022.6 | 19,450.7 | 18,370.0 | 1,032.0 | 43,223.2 | 313.1 | (718.9) | |

## 2015 Capital Expenditures by Category ($000)

| Transmission Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D (B+C) | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | Original 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | |
| Perform Wood Pole Line Management Program - Various Sites | - | - | 2,830.6 | 2,830.6 | - | 2,830.6 | - | 3,058.5 | - | - | 3,058.5 | 227.9 | 227.9 | |
| 2014 Projects | | | | | | | | | | | | | | |
| Refurbish Anchors and Footings TL202 and TL206 - Bay d'Espoir to Sunnyside | 1,191.7 | 980.2 | 988.2 | 1,968.4 | - | 2,179.9 | 211.5 | 28.2 | 1,940.0 | 0.2 | 2,179.9 | - | (1,940.2) | 18 |
| **Total Transmission Projects** | 1,191.7 | 980.2 | 3,818.8 | 4,799.0 | - | 5,010.5 | 211.5 | 3,086.7 | 1,940.0 | 0.2 | 5,238.4 | 227.9 | (1,712.3) | |

## 2015 Capital Expenditures By Category ($000)

| Distribution Projects | Capital Budget | | | | | | | | | | Actual Expenditure and Forecast | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | | | B | C | D (B+C) | E | F (A+C+E) | G | | | | | H | I | J | K (G+H+IJ) | K-F | H-D | | |
| | 2010 | 2011 | 2012 | 2013 | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes | |
| 2015 Projects | | | | | | | | | | | | | | | | | | | | | | | |
| Construct Second Distribution Feeder - Nain | - | - | - | - | - | - | 1,050.3 | 1,050.3 | - | 1,050.3 | - | - | - | - | - | 1,139.4 | - | - | 1,139.4 | 89.1 | 89.1 | | |
| Relocate Voltage Regulator - Hawkes Bay | - | - | - | - | - | - | 166.4 | 166.4 | - | 166.4 | - | - | - | - | - | 116.6 | - | - | 116.6 | (49.8) | (49.8) | | |
| Provide Service Extensions - All Service Areas | - | - | - | - | - | - | 6,328.0 | 6,328.0 | - | 6,328.0 | - | - | - | - | - | 4,797.0 | - | - | 4,797.0 | (1,531.0) | (1,531.0) | 19 | |
| Provide Service Extensions - All Service Areas - CIAC | - | - | - | - | - | - | (248.0) | (248.0) | - | (248.0) | - | - | - | - | - | (214.7) | - | - | (214.7) | 33.3 | 33.3 | | |
| Upgrade Distribution Systems - All Service Areas | - | - | - | - | - | - | 3,402.0 | 3,402.0 | - | 3,402.0 | - | - | - | - | - | 2,985.7 | - | - | 2,985.7 | (416.3) | (416.3) | 20 | |
| Upgrade Distribution Systems - All Service Areas - CIAC | - | - | - | - | - | - | (62.0) | (62.0) | - | (62.0) | - | - | - | - | - | 0.8 | - | - | 0.8 | 62.8 | 62.8 | | |
| Upgrade Distribution Systems - Various Sites (2015/2016) | - | - | - | - | - | - | 1,136.1 | 1,136.1 | 818.8 | 1,954.9 | - | - | - | - | - | 1,379.1 | 818.8 | (243.0) | 1,954.9 | - | 243.0 | 21 | |
| 2014 Projects | | | | | | | | | | | | | | | | | | | | | | | |
| Replace Recloser Control Panels - Various Sites | - | - | - | - | 111.3 | 26.3 | 84.4 | 110.7 | - | 195.7 | - | - | - | - | 85.0 | 147.7 | - | - | 232.7 | 37.0 | 37.0 | | |
| Upgrade Distribution Systems - Various Sites (2014/2015) | - | - | - | - | 2,499.8 | 177.1 | 4,850.1 | 5,027.2 | - | 7,349.9 | - | - | - | - | 2,142.5 | 5,009.7 | - | - | 7,152.2 | (197.7) | (17.5) | | |
| 2010 Projects | | | | | | | | | | | | | | | | | | | | | | | |
| Voltage Conversion - Labrador City[5] | 1,088.9 | 3,501.2 | 3,840.7 | 969.5 | 608.9 | -634.5 | 1238.2 | 603.7 | - | 11,247.4 | 1,524.6 | 2,825.0 | 4,120.6 | 1,129.8 | 1,243.4 | 854.3 | - | - | 11,697.7 | 450.3 | 250.6 | 22 | |
| **Total Distribution Projects** | 1,088.9 | 3,501.2 | 3,840.7 | 969.5 | 3,220.0 | (431.1) | 17,945.5 | 17,514.4 | 818.8 | 31,384.6 | 1,524.6 | 2,825.0 | 4,120.6 | 1,129.8 | 3,470.9 | 16,215.6 | 818.8 | (243.0) | 29,862.3 | (1,522.3) | (1,298.8) | | |

[3] As per Board Order No. P.U. 45(2014) the Board did not approve the $0.2M Voltage Conversion - Labrador City actual costs over budget from 2010 to 2013. Hydro has excluded the $0.2M from average rate base.

## 2015 Capital Expenditures By Category ($000)

| Rural Generation Projects | Capital Budget | | | | | | | | | Actual Expenditure and Forecast | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | | B | C | D (B+C) | E | F (A+C+E) | G | | | | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2011 | 2012 | 2013 | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | | | | | | | |
| Overhaul Diesel Units - Various Sites | - | - | - | - | - | 1,199.2 | 1,199.2 | - | 1,199.2 | - | - | - | - | 958.4 | - | 240.8 | 1,199.2 | - | (240.8) | 23 |
| Install Disconnect Switches for Mobile Generators - Various Sites | - | - | - | - | - | 10.0 | 10.0 | 189.3 | 199.3 | - | - | - | - | 7.8 | 189.3 | 2.2 | 199.3 | - | (2.2) | |
| Inspect Fuel Storage Tanks - Various Sites | - | - | - | - | - | 1,761.1 | 1,761.1 | - | 1,761.1 | - | - | - | - | 769.3 | - | - | 769.3 | (991.8) | (991.8) | 24 |
| Increase Fuel Storage - Rigolet | - | - | - | - | - | 1,666.8 | 1,666.8 | - | 1,666.8 | - | - | - | - | 837.1 | - | - | 837.1 | (829.7) | (829.7) | 25 |
| Upgrade Ventilation Systems - Various Sites | - | - | - | - | - | 175.9 | 175.9 | 317.3 | 493.2 | - | - | - | - | 245.6 | 317.3 | (69.7) | 493.2 | - | 69.7 | |
| Upgrade Building Exterior - Makkovik | - | - | - | - | - | 309.5 | 309.5 | - | 309.5 | - | - | - | - | 229.8 | - | - | 229.8 | (79.7) | (79.7) | |
| Increase Generation Capacity - Makkovik | - | - | - | - | - | 272.6 | 272.6 | - | 272.6 | - | - | - | - | 221.3 | - | - | 221.3 | (51.3) | (51.3) | |
| Replace Unit 2038 - Mary's Harbour | - | - | - | - | - | 103.5 | 103.5 | 1,241.5 | 1,345.0 | - | - | - | - | 101.7 | 1,241.5 | 1.8 | 1,345.0 | - | (1.8) | |
| Replace Unit 254 - Paradise River | - | - | - | - | - | 66.8 | 66.8 | 429.3 | 496.1 | - | - | - | - | 80.5 | 429.3 | (13.7) | 496.1 | - | 13.7 | |
| Replace Programmable Logic Controllers - Various Sites | - | - | - | - | - | 366.9 | 366.9 | 591.1 | 958.0 | - | - | - | - | 397.2 | 591.1 | (30.3) | 958.0 | - | 30.3 | |
| Install Fire Protection - L'Anse au Loup | - | - | - | - | - | 220.6 | 220.6 | 1,126.2 | 1,346.8 | - | - | - | - | 96.4 | 1,126.2 | 124.2 | 1,346.8 | - | (124.2) | 26 |
| 2014 Projects | | | | | | | | | | | | | | | | | | | | |
| Install Fire Protection System - Nain | - | - | - | 107.1 | 66.4 | 892.2 | 958.6 | - | 999.3 | - | - | - | 40.7 | 33.1 | - | - | 73.8 | (925.5) | (925.5) | 27 |
| Construct Storage Facility - Postville | - | - | - | 183.8 | 177.8 | - | 177.8 | - | 183.8 | - | - | - | 66.7 | 164.2 | - | - | 230.9 | 47.1 | (13.6) | |
| Upgrade Diesel Plant Production Data Collection Equipment - Various Sites | - | - | - | 268.9 | 161.1 | 269.8 | 430.9 | 280.7 | 819.4 | - | - | - | 107.8 | 57.8 | 280.7 | 3.1 | 449.4 | (370.0) | (373.1) | 28 |
| 2013 Projects | | | | | | | | | | | | | | | | | | | | |
| Additions for Load Isolator Generation Stations - Various Sites | - | - | 2,040.2 | 9,357.9 | 4,310.1 | - | 4,310.1 | - | 11,398.1 | - | 27.8 | 1196.4 | 6,853.5 | 3,916.4 | - | 393.7 | 12,387.8 | 989.7 | (393.7) | |
| 2012 Projects | | | | | | | | | | | | | | | | | | | | |
| Perform FEED for Diesel Plant Remediation - Various Sites | - | 110.4 | - | - | - | - | - | - | 110.4 | - | 43.6 | 69.2 | - | - | - | - | 112.8 | 2.4 | - | |
| 2011 Projects | | | | | | | | | | | | | | | | | | | | |
| Perform Arc Flash Remediation - Various Sites | 429.5 | 380.3 | 391.0 | 401.8 | 746.3 | 413.1 | 1,159.4 | - | 2,015.7 | 103.5 | 91.7 | 149.8 | 511.3 | 915.3 | - | - | 1,771.6 | (244.1) | (244.1) | 29 |
| **Total Rural Generation Projects** | 429.5 | 490.7 | 2,431.2 | 10,319.5 | 5,461.7 | 7,728.0 | 13,189.7 | 4,175.4 | 25,574.3 | 103.5 | 163.1 | 1,415.4 | 7,580.0 | 9,031.9 | 4,175.4 | 652.1 | 23,121.4 | (2,452.9) | (4,157.8) | |

## 2015 Capital Expenditures By Category ($000)

| Properties Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D (B+C) | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | |
| Replace Accommodations and Septic System - Ebbegunbaeg | - | - | 489.4 | 489.4 | 1,061.4 | 1,550.8 | - | 94.2 | 1,061.4 | 395.2 | 1,550.8 | - | (395.2) | 30 |
| Upgrade Line Depots - Various Sites | - | - | 953.3 | 953.3 | - | 953.3 | - | 877.0 | - | - | 877.0 | (76.3) | (76.3) | |
| Reshingle Roof - Stephenville | - | - | 76.8 | 76.8 | - | 76.8 | - | 74.9 | - | - | 74.9 | (1.9) | (1.9) | |
| Install Fall Protection Equipment - Various Sites | - | - | 198.9 | 198.9 | - | 198.9 | - | 180.7 | - | - | 180.7 | (18.2) | (18.2) | |
| Upgrade HVAC System - Port Saunders | - | - | 137.0 | 137.0 | - | 137.0 | - | 150.2 | - | - | 150.2 | 13.2 | 13.2 | |
| Legal Survey of Primary Distribution Line Right of Ways - Various Sites 2015 | - | - | 158.6 | 158.6 | 40.3 | 198.9 | - | 200.0 | - | - | 200.0 | 1.1 | 41.4 | |
| 2014 Projects | | | | | | | | | | | | | | |
| Legal Survey of Primary Distribution Line Right of Ways - Various Sites 2014 | 156.8 | (90.6) | 40.3 | (50.3) | - | 197.1 | 247.3 | (50.5) | - | - | 196.8 | (0.3) | (0.2) | |
| **Total Properties Projects** | 156.8 | (90.6) | 2,054.3 | 1,963.7 | 1,101.7 | 3,312.8 | 247.3 | 1,526.5 | 1,061.4 | 395.2 | 3,230.4 | (82.4) | (437.2) | |

## 2015 Capital Expenditures By Category ($000)

| Metering Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D (B+C) | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | |
| Purchase Meters, Equipment and Metering Tanks - Various Sites | - | - | 196.2 | 196.2 | - | 196.2 | - | 235.0 | - | - | 235.0 | 38.8 | 38.8 | |
| Install Automatic Meter Reading - Various Sites (2015-2016) | - | - | 559.9 | 559.9 | 401.8 | 961.7 | - | 90.6 | 401.8 | 469.3 | 961.7 | - | (469.3) | 31 |
| 2014 Projects | | | | | | | | | | | | | | |
| Purchase Meters, Equipment and Metering Tanks - Various Sites | 199.0 | 61.4 | - | 61.4 | - | 199.0 | 137.6 | 12.3 | - | - | 149.9 | (49.1) | (49.1) | |
| Install Automatic Meter Reading - Various Sites (2014-2015) | 356.9 | 23.7 | 340.2 | 363.9 | - | 697.1 | 333.2 | 330.6 | - | - | 663.8 | (33.3) | (33.3) | |
| **Total Metering Projects** | 555.9 | 85.1 | 1,096.3 | 1,181.4 | 401.8 | 2,054.0 | 470.8 | 668.5 | 401.8 | 469.3 | 2,010.4 | (43.6) | (512.9) | |

## 2015 Capital Expenditures By Category ($000)

| Tools and Equipment | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D (B+C) | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | |
| Replace Light Duty Mobile Equipment - Various Sites | - | - | 494.4 | 494.4 | - | 494.4 | - | 423.1 | - | - | 423.1 | (71.3) | (71.3) | |
| Replace Off Road Track Vehicles - Unit 7861, Stephenville (2015-2016) | - | - | 1.1 | 1.1 | 397.8 | 398.9 | - | 176.8 | 397.8 | (175.7) | 398.9 | - | 175.7 | 32 |
| Tools and Equipment Less than $50,000 | - | - | 622.7 | 622.7 | - | 622.7 | - | 563.1 | - | 35.8 | 598.9 | (23.8) | (59.6) | |
| 2014 Projects | | | | | | | | | | | | | | |
| Tools and Equipment Less than $50,000 | 553.3 | 31.3 | - | 31.3 | - | 553.3 | 416.7 | 33.9 | - | - | 450.6 | (102.7) | 2.6 | 33 |
| **Total Tools and Equipment** | 553.3 | 31.3 | 1,118.2 | 1,149.5 | 397.8 | 2,069.3 | 416.7 | 1,196.9 | 397.8 | (139.9) | 1,871.5 | (197.8) | 47.4 | |

## 2015 Capital Expenditures By Category ($000)

| Information Systems Projects | Capital Budget | | | | | | | Actual Expenditure and Forecast | | | | | | K-F | H-D | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | B | C | D (B+C) | E | F (A+C+E) | G | | H | I | J | K (G+H+I+J) | | | |
| | 2013 | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2013 | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | | | |
| Perform Minor Application Enhancements - Hydro Place | - | - | - | 329.5 | 329.5 | - | 329.5 | - | - | 482.1 | - | - | 482.1 | 152.6 | 152.6 | 34 |
| Cost Recoveries | - | - | - | (141.6) | (141.6) | - | (141.6) | - | - | (205.9) | - | - | (205.9) | (64.3) | (64.3) | |
| Upgrade Energy Management System - Hydro Place | - | - | - | 194.9 | 194.9 | - | 194.9 | - | - | 185.1 | - | - | 185.1 | (9.8) | (9.8) | |
| Upgrade Lotus Notes - Hydro Place | - | - | - | 635.4 | 635.4 | - | 635.4 | - | - | 559.2 | - | - | 559.2 | (76.2) | (76.2) | |
| Cost Recoveries | - | - | - | (273.1) | (273.1) | - | (273.1) | - | - | (240.4) | - | - | (240.4) | 32.7 | 32.7 | |
| Replace Customer Care System - Hydro Place | - | - | - | 134.9 | 134.9 | - | 134.9 | - | - | 141.0 | - | - | 141.0 | 6.1 | 6.1 | |
| Replace Peripheral Infrastructure - Various Sites | - | - | - | 200.5 | 200.5 | - | 200.5 | - | - | 201.7 | - | - | 201.7 | 1.2 | 1.2 | |
| Upgrade Enterprise Storage Capacity - Hydro Place | - | - | - | 621.3 | 621.3 | - | 621.3 | - | - | 627.7 | - | - | 627.7 | 6.4 | 6.4 | |
| Cost Recoveries | - | - | - | (267.0) | (267.0) | - | (267.0) | - | - | (269.9) | - | - | (269.9) | (2.9) | (2.9) | |
| Replace Personal Computers - Various Sites | - | - | - | 573.3 | 573.3 | - | 573.3 | - | - | 570.5 | - | - | 570.5 | (2.8) | (2.8) | |
| Upgrade Server Technology Program - Hydro Place | - | - | - | 601.3 | 601.3 | - | 601.3 | - | - | 639.8 | - | - | 639.8 | 38.5 | 38.5 | |
| Cost Recoveries | - | - | - | (227.1) | (227.1) | - | (227.1) | - | - | (234.1) | - | - | (234.1) | (7.0) | (7.0) | |
| 2013 Projects | | | | | | | | | | | | | | | | |
| Upgrade Microsoft Project - Hydro Place | 656.7 | 455.1 | 14.4 | 465.2 | 479.6 | - | 1,577.0 | 619.6 | 477.8 | 562.3 | - | - | 1,659.7 | 82.7 | 82.7 | |
| Cost Recoveries | (236.4) | (163.8) | (5.1) | (167.5) | (172.6) | - | (567.7) | (223.1) | (172.0) | (202.4) | - | - | (597.5) | (29.8) | (29.8) | |
| **Total Information Systems Projects** | 420.3 | 291.3 | 9.3 | 2,680.0 | 2,689.3 | - | 3,391.6 | 396.5 | 305.8 | 2,816.7 | - | - | 3,519.0 | 127.4 | 127.4 | |

## 2015 Capital Expenditures By Category ($000)

| Telecontrol Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D (B+C) | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | |
| Purchase Tools and Equipment less than $50,000 | - | - | 45.6 | 45.6 | - | 45.6 | - | 49.6 | - | - | 49.6 | 4.0 | 4.0 | |
| Replace Network Communications Equipment - Various Sites | - | - | 169.5 | 169.5 | - | 169.5 | - | 170.2 | - | - | 170.2 | 0.7 | 0.7 | |
| Upgrade Site Facilities - Various Sites | - | - | 48.3 | 48.3 | - | 48.3 | - | 51.7 | - | - | 51.7 | 3.4 | 3.4 | |
| Replace Telephone Systems - Various Sites | - | - | 132.7 | 132.7 | - | 132.7 | - | 145.5 | - | - | 145.5 | 12.8 | 12.8 | |
| Replace WIFI Access Points - Various Sites | - | - | 126.3 | 126.3 | - | 126.3 | - | 137.8 | - | - | 137.8 | 11.5 | 11.5 | |
| Replace GDC Metroplex - Various Sites | - | - | 69.2 | 69.2 | - | 69.2 | - | 38.7 | - | 30.5 | 69.2 | - | (30.5) | |
| Replace DTI Phone Turrets Energy Control Center - Hydro Place | - | - | 44.7 | 44.7 | - | 44.7 | - | 29.8 | - | - | 29.8 | (14.9) | (14.9) | |
| 2014 Projects | | | | | | | | | | | | | | |
| Replace Battery Banks and Chargers - Various Sites | 267.0 | (26.5) | 398.0 | 371.5 | - | 665.0 | 293.5 | 275.4 | - | - | 568.9 | (96.1) | (96.1) | |
| Upgrade IP SCADA Network - Various Sites | 254.2 | 109.4 | 238.7 | 348.1 | - | 492.9 | 144.8 | 445.6 | - | - | 590.4 | 97.5 | 97.5 | |
| **Total Telecontrol Projects** | 521.2 | 82.9 | 1,273.0 | 1,355.9 | - | 1,794.2 | 438.3 | 1,344.3 | - | 30.5 | 1,813.1 | 18.9 | (11.6) | |

## 2015 Capital Expenditures By Category ($000)

| Transportation | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D (B+C) | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Project Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | |
| Replace Vehicles and Aerial Devices - Hydro System (2015-2016) | - | - | 2377.1 | 2,377.1 | 225.3 | 2,602.4 | - | 1,734.9 | 225.3 | 642.2 | 2,602.4 | - | (642.2) | 35 |
| 2014 Projects | | | | | | | | | | | | | | |
| Replace Vehicles and Aerial Devices - Various Sites (2014-2015) | 1809.1 | 908.6 | 1,091.0 | 1,999.6 | - | 2,900.1 | 900.5 | 1,916.1 | - | - | 2,816.6 | (83.5) | (83.5) | |
| **Total Transportation** | 1,809.1 | 908.6 | 3,468.1 | 4,376.7 | 225.3 | 5,502.5 | 900.5 | 3,651.0 | 225.3 | 642.2 | 5,419.0 | (83.5) | (725.7) | |

| Administrative | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | 2014 | 2015 | 2016 and Beyond | Carryovers to 2016 | Total | Variance | Annual Variance | Notes |
| 2015 Projects | | | | | | | | | | | | | | |
| Remove Safety Hazards - Various Sites - 2015 | - | - | 194.9 | 194.9 | - | 194.9 | - | 176.9 | - | - | 176.9 | (18.0) | (18.0) | |
| Replace Roof - Hydro Place | - | - | 671.9 | 671.9 | - | 671.9 | - | 623.2 | - | - | 623.2 | (48.7) | (48.7) | |
| Replace Cooling Tower and Auxiliaries - Hydro Place | - | - | 45.7 | 45.7 | 311.3 | 357.0 | - | 52.5 | 311.3 | (6.8) | 357.0 | - | 6.8 | |
| Purchase Tools and Equipment less than $50,000 | - | - | 68.0 | 68.0 | - | 68.0 | - | 18.6 | - | - | 18.6 | (49.4) | (49.4) | |
| 2014 Projects | | | | | | | | | | | | | | |
| Remove Safety Hazards - Various Sites - 2014 | 257.8 | 50.2 | - | 50.2 | - | 257.8 | 207.6 | (10.6) | - | - | 197.0 | (60.8) | (60.8) | |
| **Total Administrative** | 257.8 | 50.2 | 980.5 | 1,030.7 | 311.3 | 1,549.6 | 207.6 | 860.6 | 311.3 | (6.8) | 1,372.7 | (176.9) | (170.1) | |

## 2015 Capital Expenditures By Category ($000)

### Allowance For Unforeseen

| | Capital Budget A 2013 | A 2014 | B Carryover 2014 | C Original 2015 | D (B+C) Revised 2015 | E 2016 and Beyond | F (A+C+E) Total | Actual Expenditure and Forecast G 2013 | G 2014 | H 2015 | I 2016 and Beyond | J Carryover to 2016 | K (G+H+I+J) Total | K-F Project Variance | H-D Annual Variance | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2015 Projects | | | | | | | | | | | | | | | | |
| Contingency Fund | - | - | - | 1,000.0 | 1,000.0 | - | 1,000.0 | - | - | - | - | - | - | (1,000.0) | (1,000.0) | |
| Additional Allowance for Unforeseen - Board Order No. P.U. 34(2015) | - | - | - | 250.0 | 250.0 | - | 250.0 | - | - | - | - | - | - | (250.0) | (250.0) | |
| Unit Service Transformer for Unit 3 - Holyrood Thermal Generating Station | | | | | | | | - | - | 75.8 | - | - | 75.8 | 75.8 | 75.8 | |
| Perform Upgrades - Western Avalon Transformer T5 Tap Changer | | | | | | | | - | - | 869.3 | - | - | 869.3 | 869.3 | 869.3 | |
| **Total Allowance For Unforeseen** | - | - | - | 1,250.0 | 1,250.0 | - | 1,250.0 | - | - | 945.1 | - | - | 945.1 | (304.9) | (304.9) | 36 |

### Supplemental Projects

| | Capital Budget 2013 | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | Actual Expenditure and Forecast 2013 | 2014 | 2015 | 2016 and Beyond | Carryover to 2016 | Total | Project Variance | Annual Variance | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2015 Projects | | | | | | | | | | | | | | | | |
| Purchase Critical Spares Generation Stations | - | - | - | 1,536.3 | 1,536.3 | - | 1,536.3 | - | - | 495.2 | - | 1,041.1 | 1,536.3 | - | (1,041.1) | 37 |
| Replace Rectifier Transformers - Holyrood Units 1 and 2 | - | - | - | 327.9 | 327.9 | 428.3 | 756.2 | - | - | 32.0 | 428.3 | 295.9 | 756.2 | - | (295.9) | 38 |
| Hardwoods Gas Turbine Engine Refurbishment | - | - | - | 1,249.3 | 1,249.3 | - | 1,249.3 | - | - | 1,252.1 | - | - | 1,252.1 | 2.8 | 2.8 | |
| Internal Assessment and Repair of Transformer VBN T1 | - | - | - | 500.1 | 500.1 | - | 500.1 | - | - | 321.7 | - | 178.4 | 500.1 | - | (178.4) | 39 |
| 2014 Projects | | | | | | | | | | | | | | | | |
| 100 MW (Nominal) Combustion Turbine Addition - Holyrood | - | 109,677.0 | 14,241.5 | 9,248.8 | 23,490.3 | - | 118,925.8 | - | 95,435.5 | 33,061.3 | - | - | 128,496.8 | 9,571.0 | 9,571.0 | 40 |
| Labrador West Transmission Project - Construction Phase[6] | - | 37,484.2 | - | 163,145.3 | 163,145.3 | 128,962.6 | 329,592.1 | - | 10,996.0 | 628.0 | - | - | 11,624.0 | (317,968.1) | (162,517.3) | 41 |
| Transformer T1 Replacement - Sunnyside[7] | - | 7,197.8 | 2,135.1 | 1,226.4 | 3,361.5 | - | 8,424.2 | - | 3,236.7 | 1,549.7 | - | - | 4,786.4 | (3,637.8) | (1,811.8) | 42 |
| Excitation Transformers Replacement - Bay d'Espoir | - | 636.7 | 255.7 | 360.0 | 615.7 | - | 996.7 | - | 381.0 | 659.6 | - | - | 1,040.6 | 43.9 | 43.9 | |
| Replace Unit #1 Air Compressor - Holyrood | - | 259.5 | 145.6 | 61.1 | 206.7 | - | 320.6 | - | 113.9 | 205.5 | - | - | 319.4 | (1.2) | (1.2) | |
| Purchase of Critical Spares | - | 491.8 | 491.8 | - | 491.8 | - | 491.8 | - | - | 491.8 | - | - | 491.8 | - | - | |
| 230 kV Transmission Line - Bay d'Espoir to Western Avalon | - | 2,412.6 | 2,412.6 | 18,964.7 | 21,377.3 | 270,280.7 | 291,658.0 | - | - | 2,018.2 | 287,255.0 | 2,384.8 | 291,658.0 | - | (19,359.1) | 43 |
| 2013 Projects | | | | | | | | | | | | | | | | |
| Increase 230 kV Transformer Capacity - Oxen Pond | 3,823.6 | 15,310.4 | 4,369.1 | - | 4,369.1 | - | 19,134.0 | 153.6 | 14,611.3 | 5,443.3 | - | (200.2) | 20,008.0 | 874.0 | 1,074.2 | 44 |
| **Total Supplemental Projects Approved by PUB** | 3,823.6 | 173,470.0 | 24,051.4 | 196,619.9 | 220,671.3 | 399,671.6 | 773,585.1 | 153.6 | 124,774.4 | 46,158.4 | 287,683.3 | 3,700.0 | 462,469.7 | (311,115.4) | (174,512.9) | |

### Projects Less than $50,000

| | Capital Budget 2013 | 2014 | Carryover 2014 | Original 2015 | Revised 2015 | 2016 and Beyond | Total | Actual Expenditure and Forecast 2013 | 2014 | 2015 | 2016 and Beyond | Carryover to 2016 | Total | Variance | Annual Variance | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2015 Projects | | | | | | | | | | | | | | | | |
| Replace Pumps on Mobile Transformer P235 - Bishop's Falls | - | - | - | 30.4 | 30.4 | - | 30.4 | - | - | 30.2 | - | - | 30.2 | (0.2) | (0.2) | |
| Replace Generator Unit # 580 - William's Harbour | - | - | - | 9.8 | 9.8 | - | 9.8 | - | - | 10.0 | - | - | 10.0 | 0.2 | 0.2 | |
| Purchase Pick-Up - Holyrood Gas Turbine | - | - | - | 36.7 | 36.7 | - | 36.7 | - | - | 27.2 | - | - | 27.2 | (9.5) | (9.5) | |
| Replace 125VDC Battery Bank - Paradise River Hydro Plant | - | - | - | 45.9 | 45.9 | - | 45.9 | - | - | 29.1 | - | - | 29.1 | (16.8) | (16.8) | |
| Elevator Fire Alarm Tie-in - Holyrood | - | - | - | 41.7 | 41.7 | - | 41.7 | - | - | 46.0 | - | - | 46.0 | 4.3 | 4.3 | |
| Replace Unit 7 Carbon Seal - Bay d'Espoir | - | - | - | 49.2 | 49.2 | - | 49.2 | - | - | 46.6 | - | - | 46.6 | (2.6) | (2.6) | |
| Replace Unit 7 Turbine Base Plate - Bay d'Espoir | - | - | - | 49.4 | 49.4 | - | 49.4 | - | - | 46.4 | - | - | 46.4 | (3.0) | (3.0) | |
| Spare Turbine Bearing Refurbishment Unit 1-6 - Bay d'Espoir | - | - | - | 47.4 | 47.4 | - | 47.4 | - | - | 37.2 | - | - | 37.2 | (10.2) | (10.2) | |
| Replace Unit 1 Turbine Guide Gearing - Bay d'Espoir | - | - | - | 40.3 | 40.3 | - | 40.3 | - | - | 49.5 | - | - | 49.5 | 9.2 | 9.2 | |
| Replace Valve Breaker B12L42 - Holyrood TS | - | - | - | 34.0 | 34.0 | - | 34.0 | - | - | - | - | - | - | (34.0) | (34.0) | |
| Purchase Portable Generating Unit - Oxen Pond TS | - | - | - | 28.0 | 28.0 | - | 28.0 | - | - | 28.0 | - | - | 28.0 | - | - | |
| Replace Horizontal Fuel Tanks - St. Anthony Diesel Plant | - | - | - | 48.8 | 48.8 | - | 48.8 | - | - | 50.1 | - | - | 50.1 | 1.3 | 1.3 | |
| Thrust Bearing Refurbishment Units 1 - 6, Bay d'Espoir | - | - | - | 2.5 | 2.5 | 41.2 | 43.7 | - | - | 0.1 | 41.2 | 2.4 | 43.7 | - | (2.4) | |
| Replace Interupter Bottom Brook Breaker B3L50 | - | - | - | 1.0 | 1.0 | 48.2 | 49.2 | - | - | - | 48.2 | 1.0 | 49.2 | - | (1.0) | |
| **Total Projects Less than $50,000** | - | - | - | 465.1 | 465.1 | 89.4 | 554.5 | - | - | 400.4 | 89.4 | 3.4 | 493.2 | (61.3) | (64.7) | |

[6] The construction of the Labrador West Transmission was approved by OC2014-033, February 2, 2014. The capital expenditures associated with this project are $11.6M as at December 31, 2015 and are included in Work In Progress and as a result are currently excluded from average rate base. The costs to be included in rate base will be subject to review by the Board of Commissioners of Public Utilities.

[7] Includes Insurance Proceeds relating to Sunnyside - Transformer T1 Replacement ($1.8M).

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

The projects discussed in the following section have variances of more than 10% and $100,000 when comparing budget to the 2015 expenditure, whether it is a single year project or a multiyear project. Also discussed are projects where there is a total project variance that is greater than 10% and $100,000. The projects are ordered and numbered for explanation below based on the order and number they appear in the preceding set of tables.

The majority of projects noted were executed against a Class 3 estimate that was completed for the Capital Budget Application. A Class 3 estimate is considered to have an accuracy range of -20% to +30% based on the total project budget. There is also generally a 20% contingency applied to the projects.

**Hydraulic Generation Projects**

**1. Replace ABB Exciter Unit 2 - Cat Arm (2015)**

**Budget: $845.9** **Total: $680.8** **Variance: ($165.1)**

This project is complete. The project costs for exciter manufacturing were lower than estimated. The variance is also attributable to contingency funds not being required.

**2. Replace Interior Coating on Surge Tank 3 - Bay d'Espoir (2015)**

**Budget: $1,629.3** **Total: $1,262.7** **Variance: ($366.6)**

This project is complete. The approved budget included a structural inspection as well as anticipated repairs resulting from the findings of the inspection report. The inspection report determined that structural repairs and associated costs were not required. The variance is also attributable to the contingency funds not being required.

**3. Rehabilitate Salmon River Spillway - Bay d'Espoir (2015-2016)**

**Budget: $745.6** **Total: $522.9** **Variance: ($222.7)**

This is a two-year project that commenced in 2015. A portion of the scope has been rescheduled from 2015 to 2016. There is no change to the total project budget, scope or completion date. The installation of the gate drive brakes was rescheduled from 2015 to 2016 due to a vendor supply issue. The gate

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

heater replacement was rescheduled from 2015 to 2016 to allow for re-planning of the work to lower the safety risk during construction.

**4. Replace Pump House and Associated Equipment - Bay d'Espoir (2015-2016)**

**Budget: $22.7 Total: $137.0 Variance: $114.3**

This is a two-year project that commenced in 2015. The original project schedule included engineering design from November 2015 to February 2016. The annual variance is due to the fact that engineering work was advanced and largely completed in 2015. There is no change to the overall project scope, budget or completion date.

**5. Upgrade Burnt Dam Spillway - Bay d'Espoir (2014-2015)**

**Budget: $1,186.0 Total: $640.2 Variance: ($545.8)**

This project is partially complete with the remaining scope carried into for 2016. The engineering and procurement of the diesel generator units took longer than estimated in order to ensure best available control technology in compliance with Air Pollution Control Regulations. Electrical upgrades to the Burnt Dam structure and replacement of the stop-log seals were completed later in 2015 than originally scheduled. In order to avoid congestion at site and ensure safe execution of the remaining work, the upgrades to the emergency backup hydraulic system and the mechanical gate inspection were rescheduled for 2016. The total project budget is presently being re-forecasted, and any resultant material change will be discussed with the Board.

**6. Upgrade Victoria Control Structure - Bay d'Espoir (2014-2015)**

**Budget: $415.5 Total: $235.0 Variance: ($180.5)**

This is a two-year project that commenced in 2014. The project is partially complete with the remaining scope carried into for 2016. Electrical scope and civil assessment portions of this project were completed in 2015. Due to ongoing work at Burnt Dam in 2015, the start of work at Victoria Control Structure was delayed, so as not to have both Burnt Dam and Victoria systems out of service concurrently. The late

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

start resulted in the mechanical scope being rescheduled to 2016. The total project budget is presently being re-forecasted, and any resultant material change will be discussed with the Board.

**7. Upgrade Generator Bearings Unit 2 - Bay d'Espoir (2014)**

**Budget: $414.9 Total: $262.2 Variance: ($152.7)**

This project is complete. The original project scope included modification of the guide bearing segments and modifications to the bearing oil pot covers in order to reduce generator bearing oil leakage. Upon reviewing the impacts of the modification to the bearing guide, as completed on Unit 2 in 2014 (a separate project), it was decided to only replace bearing oil pot covers and not modify the generator guide bearing segments for remaining generating units, as this achieved the desired project intent. The variance is also attributable to the contingency funds not being required.

**8. Install Handheld Pendant to Overhead Crane - Bay d'Espoir (2014-2015)**

**Budget: $175.7 Total: $19.3 Variance: ($156.4)**

This is a two-year project that commenced in 2014. The engineering and procurement for this project are complete and construction is rescheduled for 2016. This is a carryover but not a change to the total project budget or scope. During acceptance testing of the replacement parts, it was determined that additional parts were required which were not available until late December 2015. The cost of the additional parts was the responsibility of the vendor and thus did not impact the project cost.

**Thermal Generation Projects**

**9. Upgrade Powerhouse Roofing - Holyrood (2015)**

**Budget: $1,047.8 Total: $802.9 Variance: ($244.9)**

This was a single year project scheduled for completion in 2015. This project is partially complete with the remaining scope rescheduled for 2016. There is no change to the total project budget or scope. Due to weather delays that exceeded the estimated weather allowance originally included in the project plan, a portion of the roofing work was rescheduled to 2016.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

**10. Upgrade Plant Elevators - Holyrood (2014)**

**Budget: $533.2 Total: $889.2 Variance: $356.0**

This project is complete. The overall project costs included labour associated with working in a confined space. This cost was not included in the original estimate as it was not identified as a confined space. Additionally, prior to a return of service, a provincial inspector required additional upgrades that were not included in the original budget.

**11. Install Variable Frequency Drives on Forced Draft Fans - Holyrood**

**Budget: $390.7 Total: $665.7 Variance: $275.0**

This project is complete. This was a two year project that was originally planned to be completed in 2014 but was carried over into 2015. The project was completed within 10% of the total approved budget. The annual variance is attributable to engineering rework required to address issues identified during commissioning.

**Gas Turbine Generation Projects**

**12. Replace Alternator Shaft - Happy Valley (2015)**

**Budget: $484.4 Total: $131.1 Variance: ($353.3)**

This was a single year project scheduled for completion in 2015. The project engineering and procurement are complete and construction has been rescheduled for 2016. There is no change to the project total budget or scope. Upon delivery of the long lead equipment in the fall of 2015 it was decided, from a winter readiness perspective, that it would be more prudent to complete this work in the spring of 2016. The unit's availability through the winter was not impacted by this carry over.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

**Terminal Stations Projects**

**13. Upgrade Circuit Breakers - Various Sites (2015-2016)**

**Budget: $6,189.1 Total: $7,570.4 Variance: $1,381.3**

This is a two year project that commenced in 2015 and is a portion of an ongoing program to replace circuit breakers. Some breaker procurement was advanced from 2016 to 2015 to allow implementation flexibility and to enhance early 2016 work implementation to meet winter readiness timelines. The project is expected to be completed on budget.

**14. Upgrade Power Transformers - Various Sites (2015-2016)**

**Budget: $4,440.4 Total: $2,357.3 Variance: ($2,083.1)**

This is a two year project that commenced in 2015. The variance from the planned 2015 expenditures is primarily attributable to Cat Arm and Bay d'Espoir Generating Stations transformer orders being placed later than planned.

**15. Replace Disconnect Switches - Various Sites (2015-2016)**

**Budget: $963.7 Total: $563.1 Variance: ($400.6)**

This is a two year project that commenced in 2015. There is no change to the overall project scope, budget, or completion date. The detailed project planning completed in early 2015 resulted in more of the procurement being scheduled in 2015 and a greater portion of the construction scheduled for 2016. This resulted in a net negative variance in 2015 actual expenditure against the original planned expenditure, but no impact on overall project budget.

**16. Install Support Structures C2 Capacitor Bank - Hardwoods (2015)**

**Budget: $199.3 Total: $58.0 Variance: ($141.3)**

This was a single year project scheduled for completion in 2015. The project engineering and procurement are complete and construction has been rescheduled for 2016. A less costly design to address the original issue is anticipated to result in an overall budget reduction. The deferral of the

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

construction work to 2016 was based on winter readiness planning and a review of impacts on system capacity and reliability; the work was rescheduled to coordinate with the replacement of a disconnect switch (another project), thereby further reducing costs.

**17. Upgrade Circuit Breakers - Various Sites (2014-2015)**

**Budget: $3,766.2 Total: $4,167.5 Variance: $401.3**

This project is complete and the overall project variance was within 10% of approved budget. The variance from the annual planned 2015 expenditure is attributable to increased engineering and field work associated with breaker controls.

**Transmission Projects**

**18. Refurbish Anchors and Footings TL202 and TL206 - Bay d'Espoir to Sunnyside (2014)**

**Budget: $1,968.4 Total: $28.2 Variance: ($1,940.2)**

This project commenced in 2014. The engineering is complete and during project planning, it was decided to align construction with execution of the new transmission line between Bay d'Espoir and Western Avalon Terminal Stations, which is along the same corridor. The new line was approved by the Board under Order No. P. U. 53(2014) on December 12, 2014. The alignment of this project with the construction of the transmission line will result in overall cost savings to the project as well as a reduced environmental impact.

**Distribution Projects**

**19. Provide Service Extensions - All Service Areas (2015)**

**Budget: $6,328.0 Total: $4,797.0 Variance: ($1,531.0)**

This is a one year project with budget based on previous years expenditures to provide service extensions to customers. The budget and actual expenditures in 2015 are shown by area in table below. The annual variance is primarily due to less than expected service extensions in Labrador than in

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

previous years due to the economic climate in Labrador, resulting in fewer customer requests requiring extensions. The service extension numbers in Labrador are customer driven.

| | Budget ($000) | Actual ($000) | Variance ($000) |
|---|---|---|---|
| Central | 1,710.0 | 1,869.7 | 159.7 |
| Northern | 1,570.0 | 1,661.5 | 91.5 |
| Labrador | 3,048.0 | 1,265.8 | (1,782.2) |
| Total | 6,328.0 | 4,797.0 | (1,531.0) |

**20. Upgrade Distribution Systems - All Service Areas (2015)**

**Budget: $3,402.0 Total: $2,985.7 Variance: ($416.3)**

This is a one year project with budget based on previous years expenditures to provide distribution upgrades to customers. The budget and actual expenditures in 2015 are shown by area in table below. The variance is primarily due to less than expected distribution upgrades in Northern than in the previous years.

| | Budget ($000) | Actual ($000) | Variance ($000) |
|---|---|---|---|
| Central | 1,735.0 | 1,900.0 | 165.0 |
| Northern | 1,217.0 | 735.7 | (481.3) |
| Labrador | 450.0 | 350.0 | (100.0) |
| Total | 3,402.0 | 2,985.7 | (416.3) |

**21. Upgrade Distribution Systems - Various Sites (2015-2016)**

**Budget: $1,136.1 Total: $1,379.1 Variance: $243.0**

This is a multiyear project that began in 2015. There is no overall change to the project budget or completion date. The annual variance is attributable to work on the Farewell Head distribution system which included the replacement of additional cross arms and hardware to facilitate insulator replacement on Fogo Island. The cost of the additional cross arms was absorbed through the project contingency. As well, for the Bottom Waters system upgrade, a portion of the engineering design was advanced from 2016 to 2015.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

**22. Voltage Conversion - Labrador City (2010)**

**Budget: $603.7 Total: $854.3 Variance: $250.6**

This multi-year project is complete and the overall project variance was within 10% of approved budget. Annual variance is due to higher than planned execution costs.

**Rural Generation Projects**

**23. Overhaul Diesel Units - Various Sites (2015)**

**Budget: $1,199.2 Total: $958.4 Variance: ($240.8)**

This is a one year project to overhaul diesel units that are being carried over into 2016. The variance in project cost is mostly due to the late delivery of material.

**24. Inspect Fuel Storage Tanks - Various Sites (2015)**

**Budget: $1,761.1 Total: $769.3 Variance: ($991.8)**

This one-year project is complete. Resultant work from inspections was less than expected at Hardwoods Gas Turbine, McCallum and Port Hope Simpson Diesel Plants. In addition, the project contract prices were lower than estimated. One tank in L'Anse au Loup was inspected and condemned by the inspector. Following consultation with the Board, it was agreed to replace the tank under this project using available budget as any attempt to repair the tank would have exceeded the cost to replace.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

**25. Increase Fuel Storage - Rigolet (2015)**

**Budget: $1,666.8 Total: $837.1 Variance: ($829.7)**

This one-year project is complete. The contract and corresponding on-site supervision costs were significantly lower than estimated. The variance is also attributable to the contingency funds not being required.

**26. Install Fire Protection - L'Anse au Loup (2015-2016)**

**Budget: $220.6 Total: $96.4 Variance: ($124.2)**

This is a two year project that commenced in 2015. The annual variance is attributed to rescheduling a portion of the engineering design and procurement activity into 2016 Q1.

**27. Install Fire Protection System - Nain (2014)**

**Budget: $999.3 Total: $73.8 Variance: ($925.5)**

This is a multi-year project that commenced in 2014. Early in 2015, project spending was suspended when it was determined that the approved budget was inadequate to complete the planned scope of work. A revised project proposal was submitted as part of the 2016 Capital Budget Application and subsequently approved. This project will now be executed as part of the 2016 budget.

**28. Upgrade Diesel Plant Production Data Collection Equipment - Various Sites (2014-2016)**

**Budget: $430.9 Total: $57.8 Variance: ($373.1)**

This is a three-year project that commenced in 2014. There is no change to the overall scope or completion date. The variance from the planned 2015 expenditure is primarily related to an overestimation of engineering and construction costs. It is anticipated that the project will be completed in 2016 under budget.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

**29. Perform Arc Flash Remediation - Various Sites (2011-2015)**

**Budget: $2,015.7 Total: $1,771.6 Variance: ($244.1)**

This was a five year project initiated in 2011 to perform arc flash hazard remediation. The planned work is complete and the project is closed. The variance is primarily attributable to the contingency funds not being required.

**Properties Projects**

**30. Replace Accommodations and Septic System - Ebbegunbaeg (2015-2016)**

**Budget: $489.4 Total: $94.2 Variance: ($395.2)**

This is a two year project that commenced in 2015. There is no change to the total project budget, scope or completion date. Due to the requirement for an environmental assessment and flood study, the bridge installation and road upgrades planned for 2015 were rescheduled to 2016.

**Metering Projects**

**31. Install Automatic Meter Reading - Various Sites (2015-2016)**

**Budget: $559.9 Total: $90.6 Variance: ($469.3)**

This is a two year project that commenced in 2015. There is no change to the total project budget, scope or completion date. The procurement of the new meters was originally planned to be received in December 2015. Delivery is now expected in 2016 Q1 with no risk to overall project completion.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

**Tools and Equipment Projects**

**32. Replace Off Road Track Vehicles - Unit 7861 - Stephenville (2015-2016)**

| Budget: | $1.1 | Total: | $176.8 | Variance: | $175.7 |
|---|---|---|---|---|---|

This is a two-year project, with two years required due to the timing of delivery post ordering. The variance in the 2015 planned expenditure is primarily due to early arrival of the equipment.

**33. Tools and Equipment Less than $50,000 (2014)**

| Budget: | $555.3 | Total: | $450.6 | Variance: | ($102.7) |
|---|---|---|---|---|---|

The overall project variance is primarily due to the cancellation of the replacement of a material ramp until the completion of a condition assessment.

**Information Systems Projects**

**34. Perform Minor Application Enhancements - Hydro Place (2015)**

| Budget: | $329.5 | Total: | $482.1 | Variance: | $152.6 |
|---|---|---|---|---|---|

This is a one-year project that was completed in 2015. The variance was primarily for additional minor enhancements that were not anticipated.

**Transportation Projects**

**35. Replace Vehicles and Aerial Devices - Hydro System (2015-2016)**

| Budget: | $2,377.1 | Total: | $1,734.9 | Variance: | ($642.2) |
|---|---|---|---|---|---|

This is a two-year project initiated in 2015. The variance from 2015 planned expenditure is related to timing of material delivery. Various chassis manufacturers were delayed in supplying chassis to the up fitters, including five chassis and six van conversions.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

**36. Allowance For Unforeseen**

**Budget: $1,250.0 Total: $945.1 Variance: ($304.9)**

The Allowance for Unforeseen is an annual allotment that permits Hydro to act expeditiously to deal with events affecting the electrical system which cannot wait for specific approval of the Board. Unforeseen expenditures for 2015 under this account include costs associated with the Inspection and Repair of Unit Service Transformer (UST-3) for Unit 3 at Holyrood Thermal Generating Station and Performing Upgrades to the Western Avalon Terminal Station Transformer T5 Tap Changer. Reports on these items have been filed with the Board of Commissioners of Public Utilities (the Board).

The annual budget for Allowance for Unforeseen is $1,000,000. Hydro applied for and the Board approved a supplementary amount of $250,000 to be added to the balance in the Allowance for Unforeseen (P.U. 34(2015)).

**Supplemental Projects**

**37. Purchase Critical Spares - Generation Stations (2015)**

**Budget: $1,563.3 Total: $495.2 Variance: ($1,041.1)**

A number of the critical spares included in this project have lead times in excess of nine months. Orders for materials were placed upon Board approval, and therefore, materials will be received in 2016. While no additional funding is required to complete the project, the project will not be completed until 2016.

**38. Replace Excitation Transformers - Holyrood Units 1 and 2 (2015)**

**Budget: $327.9 Total: $32.0 Variance: ($295.9)**

This is a supplemental project approved by the Board in 2015 Q4. There is no overall change to the total project budget, scope or completion date. The transformers were originally planned to be received in 2015 Q4 but were actually received in 2016 Q1.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

**39. Internal Assessment and Repair of Transformer VBN T1 (2015)**

**Budget: $500.1 Total: $321.7 Variance: ($178.4)**

This is a supplemental project approved by the Board in 2015 Q4. This project was initiated and substantially completed in 2015. The scope included a major internal inspection and an allowance for repairs; however substantial repairs were not required. The project carried into 2016 for final testing and project completion. It is anticipated that the project will close under budget.

**40. 100 MW (Nominal) Combustion Turbine Addition - Holyrood (2014)**

**Budget: $23,490.3 Total: $33,061.3 Variance: $9,571.0**

This was a two year project initiated in 2014 and is now complete. The overall project variance was within 10% of approved budget. The variance from the planned 2015 expenditure was mainly attributed to the higher than budgeted cost for the building. The main contributors to the higher than budgeted cost for the building were generally as follows:

1. Building construction progress was impacted for safety considerations associated with constructing the building in parallel with and around other work fronts. Also, there were many interruptions of heavy lifts and other aerial work due to high winds and inclement weather.

2. As the priority was to get the CT into operation, a phased approach to building construction was implemented to accommodate priority work fronts. This significantly extended the construction phase of the building.

3. Increased building complexity due to interface with the turbine generator. In particular, the Heating Ventilation Air Conditioning (HVAC) system is complex due to the nature of the equipment that is being housed in the building. Also, the fire protection system is complex due to the nature of the equipment that is being protected and integrated with the HVAC system. Fire protection system design is in full compliance with FM Global standards.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

**41. Labrador West Transmission Project - Construction Phase (2014)**

**Budget: $163,145.3 Total: $628.0 Variance: ($162,517.3)**

In 2014, the Provincial Government approved the construction of the third transmission line in Labrador to help supply power for planned new developments in Labrador West, such as the Kami Iron Ore Project, and improve reliability for all customers in the region. In September 2014, work on the line was temporarily suspended until completion of Alderon's financing plan which resulted in 2015 expenditures being lower than budgeted. All project costs incurred to date, including the 2015 Interest During Constriction costs, are covered by the security Alderon has already provided. Construction will proceed should additional funding be secured.

**42. Transformer T1 Replacement - Sunnyside (2014-2015)**

**Budget: $8,424.2 Total: $4,786.4 Variance: ($3,637.8)**

This project is complete. The variance from 2015 planned expenditure is attributed to a cost recovery from insurance proceeds and lower than estimated materials and installation costs. The variance is also attributable to the contingency funds not being required.

**43. 230 kV Transmission Line - Bay d'Espoir to Western Avalon (2014-2018)**

**Budget: $21,377.3 Total: $2,018.2 Variance: ($19,359.1)**

The original budget for 2015 was $21.4M. The revised 2015 expenditure for TL267 as submitted to the Board in the 2016 Capital Budget Application on August 1 was $4.4M. As of the end of 2015, the actual expenditure was $2.018M. The noted differences were in the areas of Project Management and Engineering, where efficiencies have been realized by expanding upon the work already completed for similar designs. The work plan to this point is on schedule, with only engineering possible at this time given that the project has not been released from Environmental Assessment. The unused funds will be carried over to 2016 for the continuation and completion of engineering and the start of construction, given the relatively early stage of the project.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

**44. Increase 230 kV Transformer Capacity - Oxen Pond (2013-2014)**

**Budget: $4,369.1** **Total: $5,443.3** **Variance: $1,074.2**

This is a multiyear project that commenced in 2013, was substantially completed in 2014 and 2015, and has been carried into 2016 to complete project deficiencies. The approved project scope included work at both Oxen Pond and Hardwoods Terminal Stations. The overall project variance at completion will be within 10% of approved budget. The annual variance from the 2015 planned expenditures is attributed to higher than anticipated contract costs associated with additional purchase and processing of transformer oil to achieve required quality, and overall higher contract pricing.

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 VARIANCE EXPLANATIONS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**(Greater than $100,000 and 10% Variance from Budget)**
**($000)**

## Captial Budgets/Expenditures 2006-2015

| Year | Budget | Actual Expenditures | Variance | Percentage Variance |
|---|---|---|---|---|
| 2006 | 49,024 | 41,217 | 7,807 | 15.9% |
| 2007 | 43,304 | 35,669 | 7,635 | 17.6% |
| 2008 | 53,579 | 46,246 | 7,333 | 13.7% |
| 2009 | 61,544 | 54,152 | 7,392 | 12.0% |
| 2010 | 63,297 | 55,553 | 7,744 | 12.2% |
| 2011 | 67,454 | 63,116 | 4,338 | 6.4% |
| 2012 | 93,840 | 77,252 | 16,588 | 17.7% |
| 2013 | 116,373 | 84,755 | 31,618 | 27.2% |
| 2014 | 280,601 | 204,728 | 75,873 | 27.0% |
| 2015 | 311,177 | 125,119 | 186,058 | 59.8% |

The 2015 variance in actual expenditures compared to budget is primarily attributable to:

- $163.0M associated with work that was planned to be completed in 2015 on the Labrador West Transmission Line[1] however was not completed due to a temporary suspension of the work in September 2014. Work is suspended until completion of Alderon's financing plan for the Kami mine.
- $19.4M variance is related to the original 2015 budget for 230 kV Transmission Line - Bay d'Espoir to Western Avalon (TL267) project. This budget was revised in early 2015 to $4.4M, and the actual expenditure in 2015 was $2.0M.

[1] The construction of the Labrador West Transmission was approved by OC2014-033, February 2, 2014. The capital expenditures associated with this project are $11,624,000 as at December 31, 2015 and are included in Work In Progress and as a result are currently excluded from average rate base. The costs to be included in rate base will be subject to review by the Board.

## 2015 Carryover Report
## For the Year Ending December 31, 2015
## ($000)

| Project Name | PUB Approved Budget 2015 | Revised Budget 2015 | Total Actual Expenditures 2015 | Carryover Amount | Original Completion Year |
|---|---|---|---|---|---|
| Replace GDC Metroplex - Various Sites | 69.2 | 69.2 | 38.7 | 30.5 | 2015 |
| Upgrade Burnt Dam Spillway - Bay d'Espoir | 1,186.0 | 1,186.0 | 640.2 | 545.8 | 2015 |
| Upgrade Victoria Control Structure - Bay d'Espoir | 415.5 | 415.5 | 235.0 | 180.5 | 2015 |
| Replace Spherical By Pass Valve Assemblies Units 1 and 2 - Bay d'Espoir | 141.0 | 223.0 | 169.5 | 53.5 | 2015 |
| Install Handheld Pendant to Overhead Crane - Bay d'Espoir | 175.7 | 175.7 | 19.3 | 156.4 | 2015 |
| Upgrade Equipment Doors - Various Sites | 348.5 | 348.5 | 285.4 | 63.1 | 2015 |
| Purchase of Critical Spares - Generation Stations | 1,536.3 | 1,536.3 | 495.2 | 1,041.1 | 2015 |
| Upgrade Powerhouse Roofing - Holyrood | 1,047.8 | 1,047.8 | 802.9 | 244.9 | 2015 |
| Increase 230kV Transformer Capacity - Oxen Pond | 4,369.1 | 5,243.1 | 5,443.3 | (200.2) | 2015 |
| Install Support Structures C2 Capacitor Bank - Hardwoods | 199.3 | 84.4 | 58.0 | 26.4 | 2015 |
| Internal Assessment and Repair of Transformer VBN T1 | 500.1 | 500.1 | 321.7 | 178.4 | 2015 |
| Overhaul Diesel Units - Various Sites | 1,199.2 | 1,199.2 | 958.4 | 240.8 | 2015 |
| Additions for Load Isolator Generation Stations - Various Sites | 4,310.1 | 4,310.1 | 3,916.4 | 393.7 | 2014 |
| Tools and Equipment Less than $50,000 | 622.7 | 622.7 | 0.0 | 35.8 | 2015 |
| Replace Alternator Shaft - Happy Valley | 484.4 | 451.1 | 131.1 | 320.0 | 2015 |
| Install Automatic Meter Reading - Various Sites (2015-2016) | 559.9 | 559.9 | 90.6 | 469.3 | 2016 |
| Refurbish Unit Relay Protection - Paradise River | 8.7 | 8.7 | 9.0 | (0.3) | 2016 |
| Replace Station Service Breakers - Cat Arm | 644.9 | 644.9 | 646.1 | (1.2) | 2016 |
| Rehabilitate Salmon River Spillway - Bay d'Espoir | 745.6 | 745.6 | 522.9 | 222.7 | 2016 |
| Upgrade Generator Bearings Units 1 and 3 - Bay d'Espoir | 14.7 | 14.7 | 8.1 | 6.6 | 2016 |
| Replace Pump House and Associated Equipment - Bay d'Espoir | 22.7 | 22.7 | 137.0 | (114.3) | 2016 |
| Refurbish Intakes - Bay d'Espoir | 72.6 | 72.6 | 26.4 | 46.2 | 2016 |
| Install Infrared View Ports - Various Sites | 83.7 | 83.7 | 54.7 | 29.0 | 2016 |
| Replace Accommodations and Septic System - Ebbegunbaeg | 489.4 | 489.4 | 94.2 | 395.2 | 2016 |

## 2015 Carryover Report
## For the Year Ending December 31, 2015
## ($000)

| Project Name | PUB Approved Budget 2015 | Revised Budget 2015 | Total Actual Expenditures 2015 | Carryover Amount | Original Completion Year |
|---|---|---|---|---|---|
| Thrust Bearing Refurbishment Units 1 - 6, Bay d'Espoir | 2.5 | 2.5 | 0.1 | 2.4 | 2016 |
| Replace Rectifier Transformers - Holyrood Units 1 and 2 | 327.9 | 327.9 | 32.0 | 295.9 | 2016 |
| Upgrade Fire Protection (Main Warehouse) - Holyrood | 46.2 | 46.2 | 76.4 | (30.2) | 2016 |
| Replace Instrument Transformers - Various Sites | 745.1 | 745.1 | 755.5 | (10.4) | 2017 |
| Upgrade Circuit Breakers - Various Sites (2015-2016) | 6,189.1 | 6,189.1 | 7,570.4 | (1,381.3) | 2016 |
| Install Transformer On line Gas Monitoring - Various Sites | 700.5 | 700.5 | 786.5 | (86.0) | 2016 |
| Upgrade Power Transformers - Various Sites | 4,440.4 | 4,440.4 | 2,357.3 | 2,083.1 | 2016 |
| Replace Disconnect Switches - Various Sites (2015-2016) | 963.7 | 963.7 | 563.1 | 400.6 | 2016 |
| Design and Install Fire Protection in 230 kV Station - Various Sites | 67.6 | 67.6 | 74.9 | (7.3) | 2016 |
| Upgrade Terminal Station Protection and Control - Various Sites | 172.7 | 172.7 | 162.5 | 10.2 | 2016 |
| Replace Station Lighting - Bay d'Espoir | 16.7 | 16.7 | 20.0 | (3.3) | 2016 |
| Replace Interupter Bottom Brook Breaker B3L50 | 1.0 | 1.0 | 0.0 | 1.0 | 2016 |
| Upgrade Gas Turbine Plant Life Extension - Stephenville | 2,655.2 | 2,655.2 | 2,613.6 | 41.6 | 2016 |
| Upgrade Diesel Plant Production Data Collection Equipment-Various | 430.9 | 60.9 | 57.8 | 3.1 | 2016 |
| Install Disconnect Switches for Mobile Generators - Various Sites | 10.0 | 10.0 | 7.8 | 2.2 | 2016 |
| Replace Vehicles and Aerial Devices Hydro System (2015-2016) | 2,377.1 | 2,377.1 | 1,734.9 | 642.2 | 2016 |
| Replace Off Road Track Vehicles - Unit 7861, Stephenville (2015-2016) | 1.1 | 1.1 | 176.8 | (175.7) | 2016 |
| Refurbish Anchors and Footings TL202 and TL206 - Bay d'Espoir to Sunnyside | 1,968.4 | 28.4 | 28.2 | 0.2 | 2017 |
| Construct 230kV Transmission Line - Bay d'Espoir to Western Avalon | 21,377.3 | 4,403.0 | 2,018.2 | 2,384.8 | 2018 |
| Upgrade Distribution Systems - Various Sites (2015/2016) | 1,136.1 | 1,136.1 | 1,379.1 | (243.0) | 2016 |
| Upgrade Ventilation Systems - Various Sites | 175.9 | 175.9 | 245.6 | (69.7) | 2016 |
| Replace Unit 2038 - Mary's Harbour | 103.5 | 103.5 | 101.7 | 1.8 | 2016 |
| Replace Unit 254 - Paradise River | 66.8 | 66.8 | 80.5 | (13.7) | 2016 |
| Replace Programmable Logic Controllers - Various Sites | 366.9 | 366.9 | 397.2 | (30.3) | 2017 |
| Install Fire Protection - L'Anse au Loup | 220.6 | 220.6 | 96.4 | 124.2 | 2016 |
| Replace Cooling Tower and Auxiliaries - Hydro Place | 45.7 | 45.7 | 52.5 | (6.8) | 2016 |
| Total Carryover Amount | | | | 8,299.5 | |

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 REMOVE SAFETY HAZARDS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**($000)**

**Total Approved Budget:** **$194,900**
**Total Expenditure:** **$176,891**

**Board Order P.U. 38(2010)**

As part of Board Order No. P.U. 38(2010) 2011 Capital Budget, the following was included: "Because of the nature of this project the Board would expect to see an explanation in Hydro's annual report on capital expenditures as to each project that was undertaken, setting out the safety hazard that was identified, the location, the steps taken to address the issue and the amount of the expenditure." Please see the following table for projects undertaken in 2014:

**Safety Hazards**

| Project Title/Location | Expenditure | Safety Hazard Identified | Project Scope |
|---|---|---|---|
| Resurface deteriorated concrete floor to remove safety hazards | $34.9 | The concrete floor of the Wastewater Treatment Plant (WWTP) dyke is in rough shape with the majority of the concrete surface eroded. This poses a safety issue. When a chemical spill occurs it is difficult to do a proper clean up. The chemical residue will become lodged in the cracked and peeling concrete surface leaving behind hazardous waste in the dyke. The deteriorating surface no longer has any chemical resistant coating remaining, therefore the problem will continue to progress. This has also created a tripping hazard when working in the WWTP dyke.<br><br>The concrete floor in the Chemical Storage Building poses similar safety risks. The rough uneven surface interferes with the proper clean-up of a spill due to hazardous chemicals becoming lodge in the cracked concrete. If spills cannot be cleaned up properly, hazardous waste is left behind posing a safety risk to those entering the storage facility. The concrete sealer is deteriorating and sections are pealing from the floor creating a slipping and tripping hazard from the dislodged sections. | Resurfacing of the concrete floors in the WWTP dyke and the chemical storage building. |

**NEWFOUNDLAND AND LABRADOR HYDRO**
**2015 REMOVE SAFETY HAZARDS**
**FOR THE YEAR ENDING DECEMBER 31, 2015**
**($000)**

## Safety Hazards

| Project Title/Location | Expenditure | Safety Hazard Identified | Project Scope |
|---|---|---|---|
| Install safe walkway on Oil Tank #1 roof | $142.0 | Testing concluded that the roof plate for Tank #1 was under the minimal required thickness. An evaluation of the fuel oil storage tanks, associated pipelines and dyked drainage system was carried out at Holyrood by SGE Acres Limited. The study concluded that large areas of the Tank #1 roof plate were below the minimum required thickness of 0.09 inches; based on samples that were taken for testing. There is a risk of a worker falling through the roof plate into a large batch of bunker C oil which can result in death. | Construction of a walkway on the heavy fuel oil Tank #1 roof to allow safe access for operation of the east and west fuel oil suction heater valves. |

# Capital Expenditures and Carryover Report
# For the Year Ended December 31, 2016

*A Report to the Board of Commissioners of Public Utilities*

newfoundland labrador hydro
a nalcor energy company

# Table of Contents

1.0 Capital Budget Overview ..... 1
2.0 Capital Expenditures by Year ..... 2
3.0 Capital Expenditures by Category ..... 4
4.0 Variance Explanations (Greater than $100,000 and 10% Variance from Budget) ..... 19
5.0 Capital Budget Verses Actual Expenditures 2007 – 2016 ..... 40
6.0 Carryover Report ..... 41
7.0 Safety Hazards ..... 44

## 1.0 Capital Budget Overview

During 2016, Hydro invested $205 million to execute capital projects to contribute to the provision of safe, reliable and least-cost electricity to the people of the province. This included $59 million expended for the construction of a new transmission line between Bay d'Espoir and Western Avalon Terminal Stations. This project was released from environmental assessment in June of 2016. Significant engineering, procurement and construction activities were completed in 2016 and will continue in 2017. A significant portion of the overall capital investment included sustaining capital to replace boiler tubes for Units 1 and 2 and to overhaul the turbine and generator for Unit 3 at Holyrood Thermal Generating Station. There were also significant investments in power transformers and circuit breakers.

**Table 1**

**Total Capital Project Variance**
**2016 Overview**
**($000)**

| Asset Type | Board Approved Budget | Total Project Expenditures and Forecast | Variance |
|---|---|---|---|
| HYDRAULIC | 28,981 | 28,312 | (669) |
| THERMAL | 17,094 | 19,500 | 2,406 |
| GAS TURBINES | 6,125 | 6,656 | 531 |
| TERMINAL STATIONS | 122,691 | 125,064 | 2,373 |
| TRANSMISSION | 326,871 | 327,155 | 284 |
| DISTRIBUTION | 19,464 | 19,210 | (255) |
| RURAL GENERATION | 34,197 | 34,589 | 392 |
| PROPERTIES | 4,553 | 4,193 | (360) |
| METERING | 2,119 | 2,588 | 468 |
| RURAL SYSTEMS TOOLS AND EQUIPMENT | 2,159 | 1,762 | (396) |
| INFORMATION SYSTEMS | 4,433 | 4,363 | (69) |
| TELECONTROL | 5,583 | 5,683 | 100 |
| TRANSPORTATION | 5,135 | 5,069 | (66) |
| ADMINISTRATIVE | 1,633 | 1,382 | (251) |
| ALLOWANCE FOR UNFORESEEN | 3,000 | 13,667 | 10,667 |
| SUPPLEMENTAL PROJECTS | 361,387 | 42,500 | (318,888) |
| PROJECTS APPROVED FOR LESS THAN $50,000 | 362 | 333 | (29) |
| **TOTAL CAPITAL BUDGET** | **945,787** | **642,024** | **(303,764)** |

## 2.0 Capital Expenditures by Year

The following tables provide a summary of Hydro's Capital Expenditures by Year for the period 2012-2017.

[rest of page intentionally left blank]

## Table 2

**2016 Capital Expenditures By Year**
**($000)**

| Summary | Capital Budget[1] | | | | | | | | Actual Expenditure and Forecast | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | | B | C | D (B+C) | E | F (A+C+E) | G | | | | H | I | J | K (G+H+I+J) | K-F | H-D |
| | 2012 | 2013 | 2014 | 2015 | Carryover 2016 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance |
| 2016 Projects | | | | | | 106,199.7 | 106,199.7 | 120,950.2 | 227,149.9 | | | | | 105,800.6 | 120,950.2 | 9,556.0 | 236,306.8 | 9,156.9 | (399.1) |
| 2015 Projects | | | | 28,736.9 | 4,792.1 | 29,024.3 | 33,816.4 | 245.1 | 58,006.3 | | | | 23,772.8 | 34,334.5 | 245.1 | 1,118.2 | 59,470.6 | 1,464.3 | 518.1 |
| 2014 Projects | | | 38,677.3 | 169,315.5 | 3,324.3 | 205,566.0 | 208,890.3 | 212,872.3 | 626,431.1 | | | 11,578.8 | 3,796.2 | 62,032.2 | 205,115.0 | 27,270.5 | 309,792.7 | (316,638.4) | (146,858.1) |
| 2013 Projects | | 6,457.0 | 25,221.1 | 538.4 | 183.1 | 1,511.7 | 1,694.8 | 471.9 | 34,200.1 | 37.4 | 1,580.7 | 22,163.8 | 10,115.2 | 1,773.7 | 471.9 | 311.0 | 36,453.7 | 2,253.6 | 78.9 |
| **Grand Total** | - | 6,457.0 | 63,898.4 | 198,590.8 | 8,299.5 | 342,301.7 | 350,601.2 | 334,539.5 | 945,787.4 | 37.4 | 1,580.7 | 33,742.6 | 37,684.2 | 203,941.0 | 326,782.2 | 38,255.7 | 642,023.8 | (303,763.6) | (146,660.2) |

| | |
|---|---|
| 2016 Capital Budget Approved by Board Order No. P.U. 33(2015) | 183,082.8 |
| New Project Approved by (O.C. 2014-033)[2] | 128,962.6 |
| New Project Approved by Board Order No. P.U. 27(2015) | 428.3 |
| New Project Approved by Board Order No. P.U. 8(2016) | 1,000.0 |
| New Project Approved by Board Order No. P.U. 17 & P.U. 23 (2016) | 4,700.0 |
| New Project Approved by Board Order No. 19 (2016) | 11,800.0 |
| New Project Approved by Board Order No. 20 (2016) | 717.0 |
| New Project Approved by Board Order No. 22 (2016) | 3,047.1 |
| New Project Approved by Board Order No. 28 (2016) | 1,977.3 |
| New Project Approved by Board Order No. 37 (2016) | 490.0 |
| New Project Approved by Board Order No. 40 (2016) | 4,738.3 |
| New Project Approved by Board Order No. 48 (2016) | 1,000.0 |
| 2016 New Projects under $50,000 Approved by Hydro | 358.3 |
| Total Approved Capital Budget Before Carryovers | 342,301.7 |
| Carryovers from 2015 to 2016 | 8,299.5 |
| TOTAL APPROVED CAPITAL BUDGET | 350,601.2 |

[1] Annual budgets previous to 2016 pertain to projects that have expenditures in 2016.

[2] The construction of the Labrador West Transmission was approved by OC2014-033, February 2, 2014. The capital expenditures associated with this project are included in Work In Progress and as a result are currently excluded from average rate base. The costs to be included in rate base will be subject to review by the Board of Commissioners of Public Utilities.

## 3.0 Capital Expenditures by Category

The following tables provide Hydro's Capital Expenditures by category including: Hydraulic Generation, Thermal Generation, Gas Turbine Generation, Terminal Stations, Transmission, Distribution, Rural Generation, Properties, Metering, Tools and Equipment, Information Systems, and Telecontrol Projects.

[rest of page intentionally left blank]

## Table 3

**2016 Capital Expenditures By Category ($000)**

| Hydraulic Generation Projects | Capital Budget | | | | | | | Actual Expenditure and Forecast | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | B | C | D (B+C) | E | F (A+C+E) | G | | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2014 | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2014 | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | | | |
| Install Hydrometeorological Equipment - Various Sites | - | - | - | 314.1 | 314.1 | - | 314.1 | - | - | 4.3 | - | 309.8 | 314.1 | - | (309.8) | 1 |
| Perform Condition Assessment of Control Structures - Hinds Lake | - | - | - | 323.4 | 323.4 | - | 323.4 | - | - | 351.1 | - | - | 351.1 | 27.7 | 27.7 | |
| Replace Generator Cooling Water Piping - Hinds Lake | - | - | - | 181.7 | 181.7 | - | 181.7 | - | - | 278.4 | - | - | 278.4 | 96.7 | 96.7 | |
| Replace Control Room/Communications Room Air Conditioning - Hinds Lake | - | - | - | 41.3 | 41.3 | 53.0 | 94.3 | - | - | 31.0 | 53.0 | 10.3 | 94.3 | - | (10.3) | |
| Refurbish Station Water System - Upper Salmon | - | - | - | 96.6 | 96.6 | 197.6 | 294.2 | - | - | 38.3 | 197.6 | 58.3 | 294.2 | - | (58.3) | |
| Upgrade Work - Cat Arm | - | - | - | 558.3 | 558.3 | 1,353.0 | 1,911.3 | - | - | 240.4 | 1,353.0 | 317.9 | 1,911.3 | - | (317.9) | 2 |
| Rehabilitate Shoreline Protection - Cat Arm | - | - | - | 112.2 | 112.2 | 1,030.7 | 1,142.9 | - | - | 104.7 | 1,030.7 | 7.5 | 1,142.9 | - | (7.5) | |
| Replace Site Facilities - Bay d'Espoir | - | - | - | 928.3 | 928.3 | 11,053.0 | 11,981.3 | - | - | 270.4 | 11,053.0 | 657.9 | 11,981.3 | - | (657.9) | 3 |
| Replace Interior and Exterior Protective Coating on Surge Tank 2 - Bay d'Espoir | - | - | - | 2,959.6 | 2,959.6 | - | 2,959.6 | - | - | 2,735.7 | - | - | 2,735.7 | (223.9) | (223.9) | |
| Upgrade Public Safety Around Dams and Waterways - Bay d'Espoir | - | - | - | 477.6 | 477.6 | - | 477.6 | - | - | 334.7 | - | - | 334.7 | (142.9) | (142.9) | 4 |
| Replace PH1 Station Service Transformer - Bay d'Espoir | - | - | - | 46.7 | 46.7 | 354.5 | 401.2 | - | - | 45.0 | 354.5 | 1.7 | 401.2 | - | (1.7) | |
| Replace Monitoring Vibration System Unit 7 - Bay d'Espoir | - | - | - | 366.0 | 366.0 | - | 366.0 | - | - | 272.1 | - | - | 272.1 | (93.9) | (93.9) | |
| Replace Spherical By-Pass Valves Units 1 and 2 - Bay d'Espoir | - | - | - | 183.6 | 183.6 | 167.9 | 351.5 | - | - | 154.8 | 167.9 | 28.8 | 351.5 | - | (28.8) | |
| Assess Vent Chambers Units 1 to 6 - Bay d'Espoir | - | - | - | 85.7 | 85.7 | - | 85.7 | - | - | 85.7 | - | - | 85.7 | - | - | |
| Overhaul Turbine/Generator Units #6 and #7 - Bay d'Espoir | - | - | - | 1,345.6 | 1,345.6 | - | 1,345.6 | - | - | 544.5 | - | 56.2 | 600.7 | (744.9) | (801.1) | 5 |
| Purchase Tools and Equipment Less than $ 50,000 | - | - | - | 96.1 | 96.1 | - | 96.1 | - | - | 90.8 | - | - | 90.8 | (5.3) | (5.3) | |
| 2015 Projects | | | | | | | | | | | | | | | | |
| Refurbish Unit Relay Protection - Paradise River | - | 8.7 | (0.3) | 79.7 | 79.4 | - | 88.4 | - | 9.0 | 129.1 | - | - | 138.1 | 49.7 | 49.7 | |
| Replace Station Service Breakers - Cat Arm | - | 644.9 | (1.2) | 363.4 | 362.2 | - | 1,008.3 | - | 646.1 | 185.9 | - | 176.3 | 1,008.3 | - | (176.3) | 6 |
| Rehabilitate Salmon River Spillway - Bay d'Espoir | - | 745.6 | 222.7 | 556.8 | 779.5 | - | 1,302.4 | - | 522.9 | 871.1 | - | - | 1,394.0 | 91.6 | 91.6 | |
| Upgrade Generator Bearings Units 1 and 3 - Bay d'Espoir | - | 14.7 | 6.6 | 633.3 | 639.9 | - | 648.0 | - | 8.1 | 277.1 | - | - | 285.2 | (362.8) | (362.8) | 7 |
| Replace Pump House and Associated Equipment - Bay d'Espoir | - | 22.7 | (114.3) | 522.5 | 408.2 | - | 545.2 | - | 137.0 | 128.6 | - | 279.6 | 545.2 | - | (279.6) | 8 |
| Upgrade Equipment Doors - Various Sites | - | 348.5 | 63.1 | 0.0 | 63.1 | - | 348.5 | - | 285.4 | 115.4 | - | 46.7 | 447.5 | 99.0 | 52.3 | |
| Refurbish Intakes - Bay d'Espoir | - | 72.6 | 46.2 | 262.3 | 308.5 | - | 334.9 | - | 26.4 | 262.2 | - | - | 288.6 | (46.3) | (46.3) | |
| Install Infrared View Ports - Various Sites | - | 83.7 | 29.0 | 113.1 | 142.1 | - | 196.8 | - | 54.7 | 151.3 | - | - | 206.0 | 9.2 | 9.2 | |
| 2014 Projects | | | | | | | | | | | | | | | | |
| Upgrade Burnt Dam Spillway - Bay d'Espoir | 110.2 | 1,201.9 | 545.8 | - | 545.8 | - | 1,312.1 | 126.1 | 640.2 | 740.2 | - | - | 1,506.5 | 194.4 | 194.4 | 9 |
| Upgrade Victoria Control Structure - Bay d'Espoir | 495.1 | - | 180.5 | - | 180.5 | - | 495.1 | 79.6 | 235.0 | 446.9 | - | - | 761.5 | 266.4 | 266.4 | 10 |
| Replace Spherical By Pass Valve Assemblies Units 1 and 2 - Bay d'Espoir | 57.5 | 96.3 | 53.5 | - | 53.5 | - | 153.8 | 12.8 | 169.5 | 77.2 | - | - | 259.5 | 105.7 | 23.7 | 11 |
| Install Handheld Pendant to Overhead Crane - Bay d'Espoir | 49.9 | 170.8 | 156.4 | - | 156.4 | - | 220.7 | 45.0 | 19.3 | 166.8 | - | - | 231.1 | 10.4 | 10.4 | |
| **Total Hydraulic Generation Projects** | 712.7 | 3,410.4 | 1,188.0 | 10,647.9 | 11,835.9 | 14,209.7 | 28,980.7 | 263.5 | 2,753.6 | 9,133.7 | 14,209.7 | 1,951.0 | 28,311.5 | (669.2) | (2,702.2) | |

**Table 4**

**2016 Capital Expenditures By Category**
**($000)**

| Thermal Generation Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D (B+C) | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | |
| Upgrade Powerhouse Building Envelope - Holyrood | - | - | 2,723.8 | 2,723.8 | 3,754.0 | 6,477.8 | - | 2,239.9 | 3,754.0 | 483.9 | 6,477.8 | - | (483.9) | 12 |
| Overhaul Steam Turbine Generator Unit 3 - Holyrood | - | - | 5,868.6 | 5,868.6 | - | 5,868.6 | - | 8,147.9 | - | - | 8,147.9 | 2,279.3 | 2,279.3 | 13 |
| Rewind Rotor and Install Flux Probe Unit 3 - Holyrood | - | - | 2,755.5 | 2,755.5 | - | 2,755.5 | - | 2,879.8 | - | - | 2,879.8 | 124.3 | 124.3 | |
| Study of Space Heating and Boiler Startup Assistance - Holyrood | - | - | 148.7 | 148.7 | - | 148.7 | - | 154.0 | - | - | 154.0 | 5.3 | 5.3 | |
| Overhaul Pumps - Holyrood | - | - | 536.2 | 536.2 | - | 536.2 | - | 532.4 | - | - | 532.4 | (3.8) | (3.8) | |
| Purchase Tools and Equipment Less than $ 50,000 | - | - | 15.8 | 15.8 | - | 15.8 | - | 13.7 | - | - | 13.7 | (2.1) | (2.1) | |
| 2015 Projects | | | | | | | | | | | | | | |
| Upgrade Powerhouse Roofing - Holyrood | 1,047.8 | 244.9 | - | 244.9 | - | 1,047.8 | 802.9 | 218.8 | - | - | 1,021.7 | (26.1) | (26.1) | |
| Upgrade Fire Protection (Main Warehouse) - Holyrood | 46.2 | (30.2) | 197.6 | 167.4 | - | 243.8 | 76.4 | 196.1 | - | - | 272.5 | 28.7 | 28.7 | |
| **Total Thermal Generation Projects** | 1,094.0 | 214.7 | 12,246.2 | 12,460.9 | 3,754.0 | 17,094.2 | 879.3 | 14,382.6 | 3,754.0 | 483.9 | 19,499.8 | 2,405.6 | 1,921.7 | |

**Table 5**

**2016 Capital Expenditures By Category**
**($000)**

| Gas Turbine Generation Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D (B+C) | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2015 | 2016 | 2017 and Beyond | Carryover to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | |
| Replace Fuel Piping - Hardwoods and Stephenville | - | - | 44.8 | 44.8 | 267.0 | 311.8 | - | 11.6 | 267.0 | 33.2 | 311.8 | - | (33.2) | |
| Install Transfer Switches for Diesel Automation - Happy Valley | - | - | 148.4 | 148.4 | - | 148.4 | - | 147.7 | - | - | 147.7 | (0.7) | (0.7) | |
| 2015 Projects | | | | | | | | | | | | | | |
| Upgrade Gas Turbine Plant Life Extension - Stephenville | 2,655.2 | 41.6 | 2,525.4 | 2,567.0 | - | 5,180.6 | 2,613.6 | 3,107.4 | - | - | 5,721.0 | 540.4 | 540.4 | 14 |
| Replace Alternator Shaft - Happy Valley | 484.4 | 320.0 | - | 320.0 | - | 484.4 | 131.1 | 344.1 | - | - | 475.2 | (9.2) | 24.1 | |
| **Total Gas Turbine Generation Projects** | 3,139.6 | 361.6 | 2,718.6 | 3,080.2 | 267.0 | 6,125.2 | 2,744.7 | 3,610.8 | 267.0 | 33.2 | 6,655.7 | 530.5 | 530.6 | |

## Table 6

**2016 Capital Expenditures By Category**
**($000)**

| Terminal Stations Projects | Capital Budget | | | | | | | | Actual Expenditure and Forecast | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | B | C | D (B+C) | E | F (A+C+E) | G | | | | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2013 | 2014 | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | | | | | | |
| Upgrade Circuit Breakers - Various Sites (2016-2020) | - | - | - | - | 6,969.1 | 6,969.1 | 54,491.3 | 61,460.4 | - | - | - | - | 5,599.5 | 54,491.3 | 1,369.6 | 61,460.4 | - | (1,369.6) | 15 |
| Replace Surge Arrestors - Various Sites | - | - | - | - | 144.4 | 144.4 | 53.0 | 197.4 | - | - | - | - | 175.1 | 53.0 | (30.7) | 197.4 | - | 30.7 | |
| Replace Protective Relays - Various Sites | - | - | - | - | 700.6 | 700.6 | 1,156.4 | 1,857.0 | - | - | - | - | 1,425.8 | 1,156.4 | (725.2) | 1,857.0 | - | 725.2 | 16 |
| Replace Disconnect Switches - Various Sites (2016-2017) | - | - | - | - | 646.9 | 646.9 | 1,320.9 | 1,967.8 | - | - | - | - | 131.7 | 1,320.9 | 515.2 | 1,967.8 | - | (515.2) | 17 |
| Upgrade Digital Fault Recorders - Various Sites | - | - | - | - | 197.9 | 197.9 | 304.6 | 502.5 | - | - | - | - | 221.2 | 304.6 | (23.3) | 502.5 | - | 23.3 | |
| Upgrade Roof - Indian River | - | - | - | - | 48.3 | 48.3 | - | 48.3 | - | - | - | - | 46.0 | - | - | 46.0 | (2.3) | (2.3) | |
| Upgrade Aluminum Support Structure - Holyrood | - | - | - | - | 401.1 | 401.1 | - | 401.1 | - | - | - | - | 186.1 | - | - | 186.1 | (215.0) | (215.0) | 18 |
| Upgrade Terminal Station Equipment Foundations - Various Sites | - | - | - | - | 319.9 | 319.9 | - | 319.9 | - | - | - | - | 300.2 | - | - | 300.2 | (19.7) | (19.7) | |
| Upgrade Data Alarm Systems - Various Sites | - | - | - | - | 74.4 | 74.4 | 234.1 | 308.5 | - | - | - | - | 49.7 | 234.1 | 24.7 | 308.5 | - | (24.7) | |
| Install Breaker Failure Protection - Various Sites | - | - | - | - | 65.7 | 65.7 | 211.3 | 277.0 | - | - | - | - | 81.8 | 211.3 | (16.1) | 277.0 | - | 16.1 | |
| Install Fire Protection in 230 kV Stations - Bay d'Espoir | - | - | - | - | 200.0 | 200.0 | 566.0 | 766.0 | - | - | - | - | 91.4 | 566.0 | 108.6 | 766.0 | - | (108.6) | 19 |
| Install Spare Transformer - Happy Valley | - | - | - | - | 2,040.9 | 2,040.9 | - | 2,040.9 | - | - | - | - | 2,026.8 | - | - | 2,026.8 | (14.1) | (14.1) | |
| Upgrade Terminal Station for Mobile Substation - Cow Head | - | - | - | - | 40.0 | 40.0 | 444.7 | 484.7 | - | - | - | - | 27.5 | 444.7 | 12.5 | 484.7 | - | (12.5) | |
| Replace Air Receivers and Compressors - St. Anthony | - | - | - | - | 120.7 | 120.7 | - | 120.7 | - | - | - | - | 215.4 | - | - | 215.4 | 94.7 | 94.7 | |
| 2015 Projects | | | | | | | | | | | | | | | | | | | |
| Upgrade Circuit Breakers - Various Sites (2015-2016) | - | - | 6,189.1 | (1,381.3) | 6,873.8 | 5,492.5 | - | 13,062.9 | - | - | - | 7,570.4 | 6,022.4 | - | - | 13,592.8 | 529.9 | 529.9 | |
| Install Transformer On line Gas Monitoring - Various Sites | - | - | 700.5 | (86.0) | 975.7 | 889.7 | - | 1,676.2 | - | - | - | 786.5 | 1,065.6 | - | - | 1,852.1 | 175.9 | 175.9 | 20 |
| Upgrade Power Transformers - Various Sites | - | - | 4,440.4 | 2,083.1 | 7,002.3 | 9,085.4 | - | 11,442.7 | - | - | - | 2,357.3 | 9,472.8 | - | - | 11,830.1 | 387.4 | 387.4 | |
| Replace Disconnect Switches - Various Sites (2015-2016) | - | - | 963.7 | 400.6 | 642.9 | 1,043.5 | - | 1,606.6 | - | - | - | 563.1 | 946.3 | - | - | 1,509.4 | (97.2) | (97.2) | |
| Design and Install Fire Protection in 230 kV Station - Various Sites | - | - | 67.6 | (7.3) | 424.3 | 417.0 | - | 491.9 | - | - | - | 74.9 | 458.7 | - | - | 533.6 | 41.7 | 41.7 | |
| Upgrade Terminal Station Protection and Control - Various Sites | - | - | 172.7 | 10.2 | 307.2 | 317.4 | - | 479.9 | - | - | - | 162.5 | 734.9 | - | - | 897.4 | 417.5 | 417.5 | 21 |
| Install Support Structures C2 Capacitor Bank - Hardwoods | - | - | 199.3 | 26.4 | - | 26.4 | - | 199.3 | - | - | - | 58.0 | 21.7 | - | - | 79.7 | (119.6) | (4.7) | 22 |
| Replace Station Lighting - Bay d'Espoir | - | - | 16.7 | (3.3) | 160.3 | 157.0 | - | 177.0 | - | - | - | 20.0 | 178.4 | - | - | 198.4 | 21.4 | 21.4 | |
| 2013 Projects | | | | | | | | | | | | | | | | | | | |
| Replace Instrument Transformers - Various Sites | 593.2 | 552.8 | 538.4 | (10.4) | 1,511.7 | 1,501.3 | 471.9 | 3,668.0 | 9.6 | 230.7 | 699.0 | 755.5 | 1,190.3 | 471.9 | 311.0 | 3,668.0 | - | (311.0) | 23 |
| Increase 230 kV Transformer Capacity - Oxen Pond | 3,823.6 | 15,310.4 | - | (200.2) | - | (200.2) | - | 19,134.0 | - | 153.6 | 14,611.3 | 5,443.3 | 98.3 | - | - | 20,306.5 | 1,172.5 | 298.5 | 24 |
| **Total Terminal Stations Projects** | 4,416.8 | 15,863.2 | 13,288.4 | 831.8 | 29,868.1 | 30,699.9 | 59,254.2 | 122,690.7 | 9.6 | 384.3 | 15,310.3 | 17,791.5 | 30,767.6 | 59,254.2 | 1,546.3 | 125,063.8 | 2,373.1 | 67.7 | |

**Table 7**

**2016 Capital Expenditures by Category**
**($000)**

| Transmission Projects | Capital Budget | | | | | | | Actual Expenditure and Forecast | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | B | C | D | E | F (A+C+E) | G | | H | I | J | K(G+H+I+J) | K-F | H-D | |
| | 2014 | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2014 | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | | | |
| Construct 230 kV Transmission Line - Soldiers Pond to Hardwoods | - | - | - | 3,699.0 | 3,699.0 | 22,861.9 | 26,560.9 | - | - | 3,501.6 | 22,861.9 | 197.4 | 26,560.9 | - | (197.4) | |
| Replace Insulators - TL203 | - | - | - | 1,985.6 | 1,985.6 | - | 1,985.6 | - | - | 2,008.2 | - | - | 2,008.2 | 22.6 | 22.6 | |
| Replace Aircraft Markers at Grand Lake Crossing - TL228 | - | - | - | 589.6 | 589.6 | 978.3 | 1,567.9 | - | - | 61.8 | 978.3 | 527.8 | 1,567.9 | - | (527.8) | 25 |
| Perform Wood Pole Line Management Program - Various Sites | - | - | - | 2,919.0 | 2,919.0 | - | 2,919.0 | - | - | 3,180.1 | - | - | 3,180.1 | 261.1 | 261.1 | |
| 2014 Projects | | | | | | | | | | | | | | | | |
| Refurbish Anchors and Footings TL202 and TL206 - Bay d'Espoir to Sunnyside | 211.5 | 28.4 | 0.2 | 1,038.4 | 1,038.6 | 901.6 | 2,179.9 | 211.5 | 28.2 | 19.9 | 901.6 | 1,018.7 | 2,179.9 | - | (1,018.7) | 26 |
| 230 kV Transmission Line - Bay d'Espoir to Western Avalon | - | 4,403.0 | 2,384.8 | 75,284.3 | 77,669.1 | 211,970.7 | 291,658.0 | - | 2,018.2 | 59,317.8 | 204,213.4 | 26,108.6 | 291,658.0 | - | (18,351.3) | 27 |
| **Total Transmission Projects** | 211.5 | 4,431.4 | 2,385.0 | 85,515.9 | 87,900.9 | 236,712.5 | 326,871.3 | 211.5 | 2,046.4 | 68,089.4 | 228,955.2 | 27,852.5 | 327,155.0 | 283.7 | (19,811.5) | |

## Table 8

**2016 Capital Expenditures By Category**
**($000)**

| Distribution Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D (B+C) | | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | |
| Provide Service Extensions - All Service Areas | - | - | 5,350.0 | 5,350.0 | - | 5,350.0 | - | 6,021.5 | - | - | 6,021.5 | 671.5 | 671.5 | 28 |
| Provide Service Extensions - All Service Areas - CIAC | - | - | (200.0) | (200.0) | - | (200.0) | - | (833.1) | - | - | (833.1) | (633.1) | (633.1) | 29 |
| Upgrade Distribution Systems - All Service Areas | - | - | 3,990.0 | 3,990.0 | - | 3,990.0 | - | 3,357.4 | - | - | 3,357.4 | (632.6) | (632.6) | 30 |
| Upgrade Distribution Systems - All Service Areas - CIAC | - | - | (100.0) | (100.0) | - | (100.0) | - | (153.7) | - | - | (153.7) | (53.7) | (53.7) | |
| Upgrade Distribution Systems - Various Sites (2016/2017) | - | - | 285.6 | 285.6 | 6,350.3 | 6,635.9 | - | 361.8 | 6,350.3 | (76.2) | 6,635.9 | - | 76.2 | |
| Construct Overhead Distribution Line - Pilley's Island to Long Island | - | - | 1,239.9 | 1,239.9 | - | 1,239.9 | - | 1,509.0 | - | - | 1,509.0 | 269.1 | 269.1 | 31 |
| Additions for Load Growth - Happy Valley | - | - | 593.7 | 593.7 | - | 593.7 | - | 582.6 | - | - | 582.6 | (11.1) | (11.1) | |
| 2015 Projects | | | | | | | | | | | | | | |
| Upgrade Distribution Systems - Various Sites (2015-2016) | 1,136.1 | (243.0) | 818.8 | 575.8 | - | 1,954.9 | 1,379.1 | 710.8 | - | - | 2,089.9 | 135.0 | 135.0 | 32 |
| **Total Distribution Projects** | 1,136.1 | (243.0) | 11,978.0 | 11,735.0 | 6,350.3 | 19,464.4 | 1,379.1 | 11,556.3 | 6,350.3 | (76.2) | 19,209.5 | (254.9) | (178.7) | |

**Table 9**

**2016 Capital Expenditures By Category**
**($000)**

| Rural Generation Projects | Capital Budget | | | | | | | | Actual Expenditure and Forecast | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | B | C | D | E | (A+C+E) | G | | | | H | I | J | (G+H+I+J) | K-F | H-D | |
| | 2013 | 2014 | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | | | | | | |
| Overhaul Diesel Units - Various Sites | - | - | - | - | 2,078.4 | 2,078.4 | - | 2,078.4 | - | - | - | - | 2,526.4 | - | - | 2,526.4 | 448.0 | 448.0 | 33 |
| Upgrade Human Machine Interface - Various Sites | - | - | - | - | 114.0 | 114.0 | 320.0 | 434.0 | - | - | - | - | 125.3 | 320.0 | (11.3) | 434.0 | - | 11.3 | |
| Install Variable Frequency Drives - Grey River | - | - | - | - | 46.9 | 46.9 | 123.0 | 169.9 | - | - | - | - | 49.7 | 123.0 | (2.8) | 169.9 | - | 2.8 | |
| Inspect Fuel Storage Tanks - Various Sites | - | - | - | - | 1,326.9 | 1,326.9 | - | 1,326.9 | - | - | - | - | 1,024.5 | - | - | 1,024.5 | (302.4) | (302.4) | 34 |
| Replace Diesel Unit - Charlottetown | - | - | - | - | 1,384.9 | 1,384.9 | 46.1 | 1,431.0 | - | - | - | - | 1,442.2 | 46.1 | - | 1,488.3 | 57.3 | 57.3 | |
| Install Fire Protection Systems - Cartwright and Nain | - | - | - | - | 3,030.7 | 3,030.7 | 1,376.4 | 4,407.1 | - | - | - | - | 782.8 | 1,376.4 | 1,557.1 | 3,716.3 | (690.8) | (2,247.9) | 35 |
| Upgrade Transformer Systems - Postville and Cartwright | - | - | - | - | 465.2 | 465.2 | - | 465.2 | - | - | - | - | 296.0 | - | 169.2 | 465.2 | - | (169.2) | 36 |
| Additions for Load Growth - Various Sites | - | - | - | - | 883.4 | 883.4 | 4,746.0 | 5,629.4 | - | - | - | - | 190.4 | 4,746.0 | 693.0 | 5,629.4 | - | (693.0) | 37 |
| 2015 Projects | | | | | | | | | | | | | | | | | | | |
| Overhaul Diesel Units - Various Sites | - | - | 1,199.2 | 240.8 | - | 240.8 | - | 1,199.2 | - | - | - | 958.4 | 249.6 | - | - | 1,208.0 | 8.8 | 8.8 | |
| Install Disconnect Switches for Mobile Generators - Various Sites | - | - | 10.0 | 2.2 | 189.3 | 191.5 | - | 199.3 | - | - | - | 7.8 | 287.5 | - | - | 295.3 | 96.0 | 96.0 | |
| Upgrade Ventilation Systems - Various Sites | - | - | 175.9 | (69.7) | 317.3 | 247.6 | - | 493.2 | - | - | - | 245.6 | 290.3 | - | - | 535.9 | 42.7 | 42.7 | |
| Replace Unit 2038 - Mary's Harbour | - | - | 103.5 | 1.8 | 1,241.5 | 1,243.3 | - | 1,345.0 | - | - | - | 101.7 | 1,059.3 | - | - | 1,161.0 | (184.0) | (184.0) | 38 |
| Replace Unit 254 - Paradise River | - | - | 66.8 | (13.7) | 429.3 | 415.6 | - | 496.1 | - | - | - | 80.5 | 434.0 | - | - | 514.5 | 18.4 | 18.4 | |
| Replace Programmable Logic Controllers - Various Sites | - | - | 366.9 | (30.3) | 346.0 | 315.7 | 245.1 | 958.0 | - | - | - | 397.2 | 345.5 | 245.1 | (29.8) | 958.0 | - | 29.8 | |
| Install Fire Protection - L'Anse au Loup | - | - | 220.6 | 124.2 | 1,126.2 | 1,250.4 | - | 1,346.8 | - | - | - | 96.4 | 1,067.3 | - | - | 1,163.7 | (183.1) | (183.1) | 39 |
| 2014 Projects | | | | | | | | | | | | | | | | | | | |
| Upgrade Diesel Plant Production Data Collection Equipment-Various | - | 268.9 | 269.8 | 3.1 | 280.7 | 283.8 | - | 819.4 | - | - | 107.8 | 57.8 | 510.6 | - | 143.2 | 819.4 | - | 226.8 | 40 |
| 2013 Projects | | | | | | | | | | | | | | | | | | | |
| Additions for Load Isolator Generation Stations - Various Sites | 2,040.2 | 9,357.9 | - | 393.7 | - | 393.7 | - | 11,398.1 | 27.8 | 1,196.4 | 6,853.5 | 3,916.4 | 485.1 | - | - | 12,479.2 | 1,081.1 | 91.4 | |
| **Total Rural Generation Projects** | 2,040.2 | 9,626.8 | 2,412.7 | 652.1 | 13,260.7 | 13,912.8 | 6,856.6 | 34,197.0 | 27.8 | 1,196.4 | 6,961.3 | 5,861.8 | 11,166.5 | 6,856.6 | 2,518.6 | 34,589.0 | 392.0 | (2,746.3) | |

**Table 10**

**2016 Capital Expenditures By Category**
**($000)**

| Properties Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | |
| Upgrade Warehouse Lighting - Bishop's Falls | - | - | 15.2 | 15.2 | 180.4 | 195.6 | - | 28.1 | 180.4 | (12.9) | 195.6 | - | 12.9 | |
| Upgrade Line Depots - Various Sites | - | - | 861.4 | 861.4 | - | 861.4 | - | 955.5 | - | - | 955.5 | 94.1 | 94.1 | |
| Upgrade Office Facilities and Control Buildings - Various Sites | - | - | 1,134.0 | 1,134.0 | - | 1,134.0 | - | 675.0 | - | - | 675.0 | (459.0) | (459.0) | 41 |
| Replace Roof on Service Building - Bishop's Falls | - | - | 612.8 | 612.8 | - | 612.8 | - | 327.8 | - | 285.0 | 612.8 | - | (285.0) | 42 |
| Install Fall Protection Equipment - Various Sites | - | - | 198.8 | 198.8 | - | 198.8 | - | 203.6 | - | - | 203.6 | 4.8 | 4.8 | |
| 2015 Projects | | | | | | | | | | | | | | |
| Replace Accommodations and Septic System - Ebbegunbaeg | 489.4 | 395.2 | 1,061.4 | 1,456.6 | - | 1,550.8 | 94.2 | 811.2 | - | 645.4 | 1,550.8 | - | (645.4) | 43 |
| **Total Properties Projects** | 489.4 | 395.2 | 3,883.6 | 4,278.8 | 180.4 | 4,553.4 | 94.2 | 3,001.2 | 180.4 | 917.5 | 4,193.3 | (360.1) | (1,277.6) | |

**Table 11**

**2016 Capital Expenditures By Category**
**($000)**

| Metering Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | |
| Install Automated Meter Reading - Labrador West | - | - | 433.8 | 433.8 | 533.4 | 967.2 | - | 130.4 | 533.4 | 303.4 | 967.2 | - | (303.4) | 44 |
| Purchase Meters, Equipment and Metering Tanks - Various Sites | - | - | 190.4 | 190.4 | - | 190.4 | - | 155.6 | - | - | 155.6 | (34.8) | (34.8) | |
| 2015 Projects | | | | | | | | | | | | | | |
| Install Automatic Meter Reading - Various Sites (2015-2016) | 559.9 | 469.3 | 401.8 | 871.1 | - | 961.7 | 90.6 | 1,374.1 | - | - | 1,464.7 | 503.0 | 503.0 | 45 |
| **Total Metering Projects** | 559.9 | 469.3 | 1,026.0 | 1,495.3 | 533.4 | 2,119.3 | 90.6 | 1,660.1 | 533.4 | 303.4 | 2,587.5 | 468.2 | 164.8 | |

**Table 12**

**2016 Capital Expenditures By Category**
**($000)**

| Tools and Equipment | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | |
| Replace Light Duty Mobile Equipment - Various Sites | - | - | 348.0 | 348.0 | - | 348.0 | - | 351.4 | - | - | 351.4 | 3.4 | 3.4 | |
| Purchase Excavator - Bay d'Espoir | - | - | 312.0 | 312.0 | - | 312.0 | - | 187.0 | - | 35.0 | 222.0 | (90.0) | (125.0) | 46 |
| Tools and Equipment Less than $ 50,000 | - | - | 477.0 | 477.0 | - | 477.0 | - | 418.5 | - | - | 418.5 | (58.5) | (58.5) | |
| 2015 Projects | | | | | | | | | | | | | | |
| Replace Off Road Track Vehicles - Unit 7861, Stephenville (2015 - 2016) | 1.1 | (175.7) | 397.8 | 222.1 | - | 398.9 | 176.8 | - | - | - | 176.8 | (222.1) | (222.1) | 47 |
| Tools and Equipment Less than $ 50,000 | 622.7 | 35.8 | - | 35.8 | - | 622.7 | 563.1 | 30.4 | - | - | 593.5 | (29.2) | (5.4) | |
| **Total Tools and Equipment** | 623.8 | (139.9) | 1,534.8 | 1,394.9 | - | 2,158.6 | 739.9 | 987.3 | - | 35.0 | 1,762.2 | (396.4) | (407.6) | |

**Table 13**

**2016 Capital Expenditures By Category**
**($000)**

| Information Systems Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | |
| Perform Minor Application Enhancements - Hydro Place | - | - | 346.7 | 346.7 | - | 346.7 | - | 360.5 | - | - | 360.5 | 13.8 | 13.8 | |
| Cost Recoveries | - | - | (148.8) | (148.8) | - | (148.8) | - | (154.6) | - | - | (154.6) | (5.8) | (5.8) | |
| Implement Industrial Billing Software - Hydro Place | - | - | 443.1 | 443.1 | - | 443.1 | - | 169.5 | - | 273.6 | 443.1 | - | (273.6) | 48 |
| Upgrade Microsoft Project - Hydro Place | - | - | 683.7 | 683.7 | 1,910.7 | 2,594.4 | - | 656.9 | 1,910.7 | 26.8 | 2,594.4 | - | (26.8) | |
| Cost Recoveries | - | - | (317.1) | (317.1) | (886.2) | (1,203.3) | - | (304.8) | (886.2) | (12.3) | (1,203.3) | - | 12.3 | |
| Upgrade Sharepoint/Document Repository - Hydro Place | - | - | 267.6 | 267.6 | - | 267.6 | - | 260.3 | - | - | 260.3 | (7.3) | (7.3) | |
| Cost Recoveries | - | - | (124.1) | (124.1) | - | (124.1) | - | (120.8) | - | - | (120.8) | 3.3 | 3.3 | |
| Upgrade Energy Management System - Hydro Place | - | - | 246.2 | 246.2 | - | 246.2 | - | 256.5 | - | - | 256.5 | 10.3 | 10.3 | |
| Refresh Security Software - Hydro Place | - | - | 230.4 | 230.4 | - | 230.4 | - | 230.5 | - | - | 230.5 | 0.1 | 0.1 | |
| Cost Recoveries | - | - | (106.9) | (106.9) | - | (106.9) | - | (107.0) | - | - | (107.0) | (0.1) | (0.1) | |
| Replace Peripheral Infrastructure - Various Sites | - | - | 611.3 | 611.3 | - | 611.3 | - | 507.3 | - | - | 507.3 | (104.0) | (104.0) | 49 |
| Cost Recoveries | - | - | (186.8) | (186.8) | - | (186.8) | - | (154.7) | - | - | (154.7) | 32.1 | 32.1 | |
| Upgrade Enterprise Storage Capacity - Hydro Place | - | - | 628.8 | 628.8 | - | 628.8 | - | 464.5 | - | 164.3 | 628.8 | - | (164.3) | 50 |
| Cost Recoveries | - | - | (291.6) | (291.6) | - | (291.6) | - | (215.5) | - | (76.1) | (291.6) | - | 76.1 | |
| Replace Personal Computers - Various Sites | - | - | 861.7 | 861.7 | - | 861.7 | - | 850.0 | - | - | 850.0 | (11.7) | (11.7) | |
| Upgrade Server Technology Program - Hydro Place | - | - | 492.5 | 492.5 | - | 492.5 | - | 451.1 | - | 41.4 | 492.5 | - | (41.4) | |
| Cost Recoveries | - | - | (228.5) | (228.5) | - | (228.5) | - | (209.3) | - | (19.2) | (228.5) | - | 19.2 | |
| **Total Information Systems Projects** | - | - | 3,408.2 | 3,408.2 | 1,024.5 | 4,432.7 | - | 2,940.4 | 1,024.5 | 398.5 | 4,363.4 | (69.3) | (467.8) | |

**Table 14**

**2016 Capital Expenditures By Category**
**($000)**

| Telecontrol Projects | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | |
| Purchase Tools and Equipment less than $50,000 | - | - | 45.6 | 45.6 | - | 45.6 | - | 51.9 | - | - | 51.9 | 6.3 | 6.3 | |
| Replace Battery Banks and Chargers - Various Sites | - | - | 425.0 | 425.0 | 456.6 | 881.6 | - | 365.7 | 456.6 | 59.3 | 881.6 | - | (59.3) | |
| Replace MDR 4000 Microwave Radio East - Various Sites | - | - | 77.4 | 77.4 | 1,093.1 | 1,170.5 | - | 113.4 | 1,093.1 | (36.0) | 1,170.5 | - | 36.0 | |
| Replace UPS Systems - Hydro Place | - | - | 889.8 | 889.8 | - | 889.8 | - | 928.6 | - | (38.8) | 889.8 | - | 38.8 | |
| Replace Network Communication Equipment - Various Sites | - | - | 186.4 | 186.4 | - | 186.4 | - | 183.0 | - | - | 183.0 | (3.4) | (3.4) | |
| Upgrade Site Facilities - Various Sites | - | - | 49.5 | 49.5 | - | 49.5 | - | 56.1 | - | - | 56.1 | 6.6 | 6.6 | |
| Replace Radomes - Various Sites | - | - | 235.2 | 235.2 | - | 235.2 | - | 230.1 | - | - | 230.1 | (5.1) | (5.1) | |
| Replace Air Conditioners - Various Sites | - | - | 39.9 | 39.9 | 152.0 | 191.9 | - | 51.2 | 152.0 | (11.3) | 191.9 | - | 11.3 | |
| Replace Video Conferencing Bridge - Hydro Place | - | - | 182.6 | 182.6 | - | 182.6 | - | 213.8 | - | - | 213.8 | 31.2 | 31.2 | |
| Upgrade Access Roads to Microwave Sites - Various Sites | - | - | 141.1 | 141.1 | - | 141.1 | - | 161.3 | - | - | 161.3 | 20.2 | 20.2 | |
| Upgrade Remote Terminal Units - Various Sites | - | - | 89.6 | 89.6 | - | 89.6 | - | 106.2 | - | - | 106.2 | 16.6 | 16.6 | |
| Replace Wescom Transceivers - Various Sites | - | - | 49.3 | 49.3 | - | 49.3 | - | 55.2 | - | - | 55.2 | 5.9 | 5.9 | |
| Replace Powerline Carrier - Various Sites | - | - | 73.4 | 73.4 | 763.4 | 836.8 | - | 77.4 | 763.4 | (4.0) | 836.8 | - | 4.0 | |
| Upgrade Telecontrol Facilities - Sandy Brook Hill | - | - | 101.6 | 101.6 | 462.4 | 564.0 | - | 81.7 | 462.4 | 19.9 | 564.0 | - | (19.9) | |
| 2015 Projects | | | | | | | | | | | | | | |
| Replace GDC Metroplex - Various Sites | 69.2 | 30.5 | - | 30.5 | - | 69.2 | 38.7 | 51.7 | - | - | 90.4 | 21.2 | 21.2 | |
| **Total Telecontrol Projects** | 69.2 | 30.5 | 2,586.4 | 2,616.9 | 2,927.5 | 5,583.1 | 38.7 | 2,727.3 | 2,927.5 | (10.9) | 5,682.6 | 99.5 | 110.4 | |

**Table 15**

**2016 Capital Expenditures By Category**
**($000)**

| Transportation | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F (A+C+E) | G | H | I | J | K (G+H+I+J) | K-F | H-D | |
| | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Project Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | |
| Replace Vehicles and Aerial Devices - Various Sites (2016-2017) | - | - | 1,443.3 | 1,443.3 | 534.2 | 1,977.5 | - | 1,032.7 | 534.2 | 410.6 | 1,977.5 | - | (410.6) | 51 |
| Purchase Vehicles and Aerial Devices - Various Sites | - | - | 382.5 | 382.5 | 172.7 | 555.2 | - | 470.4 | 172.7 | (87.9) | 555.2 | - | 87.9 | |
| 2015 Projects | | | | | | | | | | | | | | |
| Replace Vehicles and Aerial Devices Hydro System (2015-2016) | 2,377.1 | 642.2 | 225.3 | 867.5 | - | 2,602.4 | 1,734.9 | 801.8 | - | - | 2,536.7 | (65.7) | (65.7) | |
| **Total Transportation** | 2,377.1 | 642.2 | 2,051.1 | 2,693.3 | 706.9 | 5,135.1 | 1,734.9 | 2,304.9 | 706.9 | 322.7 | 5,069.4 | (65.7) | (388.4) | |

| Administrative | Capital Budget | | | | | | Actual Expenditure and Forecast | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2015 | 2016 | 2017 and Beyond | Carryovers to 2017 | Total | Variance | Annual Variance | Notes |
| 2016 Projects | | | | | | | | | | | | | | |
| Remove Safety Hazards - Various Sites - 2015 | - | - | 199.3 | 199.3 | - | 199.3 | - | 175.4 | - | - | 175.4 | (23.9) | (23.9) | |
| Replace Roof - Hydro Place | - | - | 639.5 | 639.5 | - | 639.5 | - | 576.2 | - | - | 576.2 | (63.3) | (63.3) | |
| Replace Air Conditioning Units 8 and 14 - Hydro Place | - | - | 34.6 | 34.6 | 229.5 | 264.1 | - | 31.0 | 229.5 | 3.6 | 264.1 | - | (3.6) | |
| Purchase Tools and Equipment less than $50,000 | - | - | 172.6 | 172.6 | - | 172.6 | - | 55.1 | - | - | 55.1 | (117.5) | (117.5) | 52 |
| 2015 Projects | | | | | | | | | | | | | | |
| Replace Cooling Tower and Auxiliaries - Hydro Place | 45.7 | (6.8) | 311.3 | 304.5 | - | 357.0 | 52.5 | 258.5 | - | - | 311.0 | (46.0) | (46.0) | |
| **Total Administrative** | 45.7 | (6.8) | 1,357.3 | 1,350.5 | 229.5 | 1,632.5 | 52.5 | 1,096.2 | 229.5 | 3.6 | 1,381.8 | (250.7) | (254.3) | |

## Table 16

**2016 Capital Expenditures By Category**
**($000)**

| Allowance For Unforeseen | Capital Budget | | | | | | | Actual Expenditure and Forecast | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | B | C | D | E | F (A+C+E) | G | | H | I | J | K (G+H+I+J) | K-F | H-D | | |
| | 2014 | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2014 | 2015 | 2016 | 2017 and Beyond | Carryover to 2017 | Total | Project Variance | Annual Variance | Notes | |
| 2016 Projects | | | | | | | | | | | | | | | | | |
| Contingency Fund | - | - | - | 1,000.0 | 1,000.0 | - | 1,000.0 | - | - | - | - | - | 0.0 | (1,000.0) | (1,000.0) | | |
| Perform Upgrades - Western Avalon Transformer T5 Tap Changer | - | - | - | - | - | - | - | - | - | 474.0 | - | - | 474.0 | 474.0 | 474.0 | | |
| Boiler Tube Replacement - Holyrood Generating Station Unit 2 | - | - | - | - | - | - | - | - | - | 1,565.6 | - | - | 1,565.6 | 1,565.6 | 1,565.6 | | |
| Boiler Tube Replacement - Holyrood Generating Station Unit 1 | - | - | - | - | - | - | - | - | - | 928.3 | - | - | 928.3 | 928.3 | 928.3 | | |
| Transmission Line TL 259 Rerouting - Sally's Cove | - | - | - | - | - | - | - | - | - | 1,387.2 | - | - | 1,387.2 | 1,387.2 | 1,387.2 | | |
| Penstock #1 Weld Refurbishment - Bay d'Espoir | | | | - | - | - | - | - | - | 6,589.2 | - | - | 6,589.2 | 6,589.2 | 6,589.2 | | |
| Access Road Rehabilitations - Bay d'Espoir | | | | - | - | - | - | - | - | 2,722.6 | - | - | 2,722.6 | 2,722.6 | 2,722.6 | | |
| Contingency Top Up - P.U.8 (2016) | - | - | - | 1,000.0 | 1,000.0 | - | 1,000.0 | - | - | - | - | - | - | (1,000.0) | (1,000.0) | | |
| Contingency Top Up -P.U.48 (2016) | - | - | - | 1,000.0 | 1,000.0 | - | 1,000.0 | - | - | - | - | - | - | (1,000.0) | (1,000.0) | | |
| **Total Allowance For Unforeseen** | - | - | - | 3,000.0 | 3,000.0 | - | 3,000.0 | - | - | 13,666.9 | - | - | 13,666.9 | 10,666.9 | 10,666.9 | 53 | |

| Supplemental Projects | Capital Budget | | | | | | | Actual Expenditure and Forecast | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2014 | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2014 | 2015 | 2016 | 2017 and Beyond | Carryover to 2017 | Total | Project Variance | Annual Variance | Notes | |
| 2016 Projects | | | | | | | | | | | | | | | | | |
| Upgrade Units 1 and 2 Lower Reheaters | - | - | - | 11,800.0 | 11,800.0 | - | 11,800.0 | - | - | 11,734.4 | - | - | 11,734.4 | (65.6) | (65.6) | | |
| Purchase of 12 MW Diesel Generation - Holyrood | - | - | - | 4,700.0 | 4,700.0 | [ . . . ] | 4,700.0 | - | - | 3,784.0 | [ . . . ] | 916.0 | 4,700.0 | - | (916.0) | 62 | |
| TL 227 Distribution Line Sally's Cove L1 | - | - | - | 717.0 | 717.0 | 1,533.0 | 2,250.0 | - | - | 186.3 | 1,533.0 | 530.7 | 2,250.0 | - | (530.7) | 54 | |
| Refurbish Gas Generator Engines - Hardwoods and Stephenville | - | - | - | 3,047.1 | 3,047.1 | - | 3,047.1 | - | - | 2,538.7 | - | 508.4 | 3,047.1 | - | (508.4) | 55 | |
| Unit 4 Turbine Primary Seal Clearance - Bay d'Espoir | - | - | - | 1,977.3 | 1,977.3 | - | 1,977.3 | - | - | 1,517.9 | - | - | 1,517.9 | (459.4) | (459.4) | 56 | |
| CT - Combustion Inspection and Overhaul - Holyrood | - | - | - | 4,738.3 | 4,738.3 | - | 4,738.3 | - | - | 3,967.2 | - | - | 3,967.2 | (771.1) | (771.1) | 57 | |
| Purchase Wabush Terminal Station | - | - | - | 490.0 | 490.0 | - | 490.0 | - | - | 464.1 | - | - | 464.1 | (25.9) | (25.9) | | |
| 2015 Projects | | | | | | | | | | | | | | | | | |
| Purchase Critical Spares Generation Stations | - | 1,536.3 | 1,041.1 | - | 1,041.1 | - | 1,536.3 | - | 495.2 | 731.2 | - | - | 1,226.4 | (309.9) | (309.9) | 58 | |
| Replace Rectifier Transformers - Holyrood Units 1 and 2 | - | 327.9 | 295.9 | 428.3 | 724.2 | - | 756.2 | - | 32.0 | 838.4 | - | - | 870.4 | 114.2 | 114.2 | 59 | |
| Transformer VBN T1 Major Internal Assessment | - | 500.1 | 178.4 | - | 178.4 | - | 500.1 | - | 321.7 | 23.8 | - | - | 345.5 | (154.6) | (154.6) | 60 | |
| 2014 Projects | | | | | | | | | | | | | | | | | |
| Labrador West Transmission Project - Construction Phase[1] | 37,484.2 | 163,145.3 | - | 128,962.6 | 128,962.6 | - | 329,592.1 | 10,996.0 | 628.0 | 752.8 | - | - | 12,376.8 | (317,215.3) | (128,209.8) | 61 | |
| **Total Supplemental Projects Approved by PUB** | 37,484.2 | 165,509.6 | 1,515.4 | 156,860.6 | 158,376.0 | 1,533.0 | 361,387.4 | 10,996.0 | 1,476.9 | 26,538.8 | 1,533.0 | 1,955.1 | 42,499.8 | (318,887.6) | (131,837.2) | | |

| Projects Less than $50,000 | Capital Budget | | | | | | | Actual Expenditure and Forecast | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2014 | 2015 | Carryover 2015 | Original 2016 | Revised 2016 | 2017 and Beyond | Total | 2014 | 2015 | 2016 | 2017 and Beyond | Carryover to 2017 | Total | Project Variance | Annual Variance | Notes | |
| 2016 Projects | | | | | | | | | | | | | | | | | |
| Hardwoods Station Service Artificial Neutral | - | - | - | 42.1 | 42.1 | - | 42.1 | - | - | 42.2 | - | - | 42.2 | 0.1 | 0.1 | | |
| Tank 1 External Inspection and Condition Assessment - Holyrood | - | - | - | 39.8 | 39.8 | - | 39.8 | - | - | 24.4 | - | - | 24.4 | (15.4) | (15.4) | | |
| Exciter Refurbishment - Corner Brook Frequency Converter (CBFC) | - | - | - | 49.0 | 49.0 | - | 49.0 | - | - | 46.9 | - | - | 46.9 | (2.1) | (2.1) | | |
| HWD Snow Door Overhaul | - | - | - | 46.7 | 46.7 | - | 46.7 | - | - | 48.4 | - | - | 48.4 | 1.7 | 1.7 | | |
| Replace Radiator Unit 2029 Makkovik | - | - | - | 49.0 | 49.0 | - | 49.0 | - | - | 27.5 | - | 21.5 | 49.0 | - | (21.5) | | |
| St. Anthony, Mary's Harbour, Port Hope Simpson - Lighting Replacement | - | - | - | 42.3 | 42.3 | - | 42.3 | - | - | 40.4 | - | - | 40.4 | (1.9) | (1.9) | | |
| 2015 Projects | | | | | | | | | | | | | | | | | |
| Thrust Bearing Refurbishment Units 1 - 6, Bay d'Espoir | - | 2.5 | 2.4 | 41.2 | 43.6 | - | 43.7 | - | 0.1 | 32.7 | - | - | 32.8 | (10.9) | (10.9) | | |
| Replace Interrupter Bottom Brook Breaker B3L50 | - | 1.0 | 1.0 | 48.2 | 49.2 | - | 49.2 | - | - | 48.5 | - | - | 48.5 | (0.7) | (0.7) | | |
| **Total Projects Less than $50,000** | - | 3.5 | 3.4 | 358.3 | 361.7 | - | 361.8 | - | 0.1 | 311.0 | - | 21.5 | 332.6 | (29.2) | (50.7) | | |

[1] The construction of the Labrador West Transmission was approved by OC2014-033, February 2, 2014. The capital expenditures associated with this project are included in Work In Progress and as a result are currently excluded from average rate base. The costs to be included in rate base will be subject to review by the Board of Commissioners of Public Utilities.

# 4.0 Variance Explanations (Greater than $100,000 and 10% Variance from Budget)

The projects discussed in the following section have 2016 variances of more than 10% and $100,000 when comparing the approved budget to the 2016 expenditures, whether it is a single year project or a multiyear project. Also discussed are projects where there is a total project variance greater than 10% and $100,000. The projects are ordered and numbered based upon the order and number they appear in the preceding set of tables.

## 4.1 Hydraulic Generation Projects

**1. Install Hydrometeorological Equipment - Various Sites (2016)**

**Budget: $314.1 Total: $4.3 Variance: ($309.8)**

This is a one year project that has been carried over into 2017 for further evaluation of the technology prior to construction. In 2015, prior to this project, a snow water equivalent sensor was loaned to Hydro and installed at Victoria Hydrometeorological Station. The 2016 project was to purchase the loaner and an additional three snow water equivalent sensors for other sites. The data collected from the loaner sensor in the spring of 2016 was not accurate, so the project was put on hold. The sensor supplier believes the problem to be a calibration error. Hydro has requested to keep the loaner for an additional year with recalibration. If the recalibration gives acceptable results in spring of 2017, then the project will proceed.

**2. Upgrade Work – Cat Arm (2016)**

**Budget: $558.3 Total: $240.4 Variance: ($317.9)**

This is a two year project that commenced in 2016. Procurement of the deflector servo motor was originally scheduled for late 2016 and will now be procured in early 2017 with no effect on the overall execution schedule. The budget, scope and schedule remain unchanged.

**3. Replace Site Facilities – Bay d'Espoir (2016)**

**Budget: $928.3 Total: $270.4 Variance: ($657.9)**

This is a three year project that commenced in 2016. The less than forecasted spend in the first year was due to lower than expected design consultant cost. The project remains on schedule with no change to the overall budget, scope or completion date.

**4. Upgrade Public Safety Around Dams and Waterways - Bay d'Espoir (2016)**

**Budget: $477.6 Total: $334.7 Variance: ($142.9)**

This was a one year project that is part of an ongoing program to upgrade public safety around dams and waterways. The 2016 work was cut short due to Hurricane Matthew's impact on crew availability, and therefore the project was closed in 2016. Remaining scope will be completed in 2017 as part of the next Public Safety Around Dams Project. The scope of work that has been moved into 2017 is within the contingency for the 2017 project. The variance is also attributable to the 2016 contingency funds not being required.

**5. Overhaul Turbine/Generator Units #6 and #7 – Bay d'Espoir (2016)**

**Budget: $1,345.6 Total: $544.5 Variance: ($801.1)**

This was a one year project and due to unresolved contract terms with the original equipment manufacturer, and schedule conflicts with other on-going work, it was decided to limit part of the rotor scope that was included in the whole project. The rotor scope was to address unacceptable vibration levels and was limited to design only, with construction deferred until 2017. The generator bearing was replaced during the outage and resulted in a significant improvement to the operating vibration levels. Based on this improved performance, it was decided to cancel the remaining rotor scope instead of deferring it to 2017 in order to provide a timeframe to assess the long term performance of the generator with the new bearing. Approximately $60,000 of the project funds was carried into 2017 to allow time for the old generator bearing to be refurbished and returned as a capital critical spare.

**6. Replace Station Service Breakers – Cat Arm (2015)**

**Budget: $362.2 Total: $185.9 Variance: ($176.3)**

This is a two year project that commenced in 2015 and was carried over to 2017. The primary scope of this project, accounting for approximately 65% of the project budget, was the replacement of the breakers, which was completed in 2015. The programmable logic controller upgrade was scheduled for 2016 during the planned outage to Cat Arm Units 1 and 2. That planned outage was compressed as a result of the need for emergency refurbishment of Penstock 1 in Bay d'Espoir. The risk of completing this project in a compressed 2016 outage was weighed against the risk of carrying the project over to 2017 and it was determined that moving the project to 2017 would be the least risk option.

**7. Upgrade Generator Bearings Units 1 and 3 – Bay d'Espoir (2015)**

**Budget: $648.0 Total: $285.2 Variance: ($362.8)**

This is a two year project that commenced in 2015 and is now complete. The original project scope included bearing modifications to reduce generator bearing oil leakage. Upon reviewing the impacts of bearing modifications that were completed on Unit 2 in 2014 (a separate project), it was decided to reduce the scope to only what was necessary and the desired project intent was still achieved.

**8. Replace Pump House and Associated Equipment – Bay d'Espoir (2015)**

**Budget: $408.2 Total: $128.6 Variance: ($279.6)**

This is a two year project that commenced in 2015 and is being carried over into 2017/2018. Engineering work commenced, and the construction was tendered but not awarded in early 2016, since tendered prices were significantly higher than the budget. The project was carried over to realign on scope and determine if any savings could be realized in pairing this project with the construction of the Replace Site Facilities Project in Bay d'Espoir. The site facilities construction project is planned to commence in 2017 with completion in fall of 2018. The schedule for the Replace Pump House and Associated Equipment project has been modified to align with the construction schedule for the Replace Site Facilities Project.

**9. Upgrade Burnt Dam Spillway – Bay d'Espoir (2014)**

**Budget: $1,312.1 Total: $1,506.5 Variance: $194.4**

This project is complete. This was a two year project that commenced in 2014 with partial scope carried over to 2016. Additional funds were required to complete 2016 construction due to higher than expected engineering and operations support costs. The higher costs were attributed to the lack of suitable accommodations close to site resulting in longer travel time, extended construction schedules, and additional vehicle and helicopter cost. The material supply cost for the new diesel generator sets was also higher than the original estimate.

**10. Upgrade Victoria Control Structure - Bay d'Espoir (2014)**

**Budget: $495.1 Total: $761.5 Variance: $266.4**

This project is complete. This was a two year project that commenced in 2014 with partial scope carried over to 2016. Additional funds were required to complete 2016 construction due to higher than expected contractor and operations support costs. The higher costs were attributed to the lack of suitable accommodation close to site resulting in longer travel time, extended construction schedules, and additional vehicle and helicopter cost.

**11. Replace Spherical By Pass Valve Assemblies Units 1 and 2 – Bay d'Espoir (2014)**

**Budget: $153.8 Total: $259.5 Variance: $105.7**

This project is complete. The cost of the replacement by-pass valves and actuator, and the amount of construction labour required, was higher than originally budgeted.

## 4.2 Thermal Generation Projects

**12. Upgrade Powerhouse Building Envelope - Holyrood (2016)**

**Budget: $2,723.8 Total: $2,239.9 Variance: ($483.9)**

This is a three year project that commenced in 2016. A portion of the planned construction in 2016 has been deferred to 2017. The delay was a result of the need to tender the construction work a second time (after the first tender call was unsuccessful due to bidders

not meeting the safety requirements), as well as greater than expected weather delays. There is no change to the overall budget, scope or completion date for this project.

**13. Overhaul Steam Turbine Generator Unit 3 - Holyrood (2016)**

**Budget: $5,868.6 Total: $8,147.9 Variance: $2,279.3**

This is a one year project. The variance is due to several factors. Internal labor costs were higher than estimated due to the removal and reinstallation of the synchronous condenser skid. The contractor experienced difficulty in dismantling the unit due to the fact that the last major overhaul was 9 years ago, resulting in additional labour hours and broken parts. Finally, findings during the inspection and discovery phase of the overhaul resulted in more repairs and parts replaced than estimated.

## 4.3 Gas Turbine Generation Projects

**14. Upgrade Gas Turbine Plant Life Extension - Stephenville (2015)**

**Budget: $5,180.6 Total: $5,721.0 Variance: $540.4**

This is a two year project that commenced in 2015 and is complete. The total project variance is attributed to higher than expected publicly tendered prices for the fire protection upgrades, and the requirement of more extensive refurbishment of the exhaust stacks than expected. The extent of the stack refurbishment could only be accurately determined once the unit was disassembled for the work.

## 4.4 Terminal Stations Projects

**15. Upgrade Circuit Breakers - Various Sites (2016-2020)**

**Budget: $6,969.1 Total: $5,599.5 Variance: ($1,369.6)**

This is a five year project that commenced in 2016 and is a part of an ongoing program to replace circuit breakers in terminal stations. Some breaker procurement and engineering work was advanced from 2016 to 2015 (against the Upgrade Circuit Breakers - Various Sites (2015-2016) Project) to allow implementation flexibility in 2016 and to ensure successful completion of breaker installations for winter readiness timelines. The overall project is

currently expected to be completed on budget. An overall reforecast of the project will be undertaken at the end of 2017

**16. Replace Protective Relays – Various Sites (2016)**

**Budget: $700.6 Total: $1,425.8 Variance: $725.2**

This is a two year project that commenced in 2016. During the design phase of the project, Hydro's design standard for protection relays was revised to address lessons learned from system events experienced since 2014. The updated standard significantly impacted the overall design for all protection relays. This increased the engineering design effort on the project and resulted in increased procurement and construction costs due to the requirement for additional components to adhere to the new standard.

**17. Replace Disconnect Switches - Various Sites (2016-2017)**

**Budget: $646.9 Total: $131.7 Variance: ($515.2)**

This is a two-year project that commenced in 2016. The variance in the first year expenditure is attributable to a delay in receipt of materials. The new disconnect switches were originally expected to be delivered in Q4 of 2016, but are delayed until Q1 of 2017. This delay in materials delivery does not impact the construction schedule. The original budget included an allowance in 2016 for any unforeseen construction for early failures, but this was not required. There is no change to the overall project scope, budget or completion date.

**18. Upgrade Aluminum Support Structure – Holyrood (2016)**

**Budget: $401.1 Total: $186.1 Variance: ($215.0)**

This was a single year project completed in 2016. This project was executed in parallel with a separate project to Upgrade Terminal Station Equipment Foundations. This allowed Hydro to realize efficiencies and cost savings for engineering, procurement and construction.

**19. Install Fire Protection in 230 kV Stations – Bay d'Espoir (2016)**

**Budget: $200.0 Total: $91.4 Variance: ($108.6)**

This is a two year project that commenced in 2016. During detailed project planning, it was determined that the procurement of materials could wait until 2017 without impacting the construction schedule. There is no change to the overall project scope, budget or schedule.

**20. Install Transformer On line Gas Monitoring – Various Sites (2015)**

**Budget: $1,676.2 Total: $1,852.1 Variance: $175.9**

This was a two-year project that commenced in 2015 and was completed in 2016. The overall project variance was within 10.5% of approved budget. The variance is attributed to higher than anticipated engineering efforts to integrate the new technology to existing transformers, as well as telecommunications upgrades to support the new equipment.

**21. Upgrade Terminal Station Protection and Control – Various Sites (2015)**

**Budget: $479.9 Total: $897.4 Variance: $417.5**

This is a two year project that commenced in 2015 and was completed in 2016. During the design phase of the project, Hydro's design standard for breaker failure protection was revised. The changes to the standard were made to address lessons learned from system events experienced since 2014. The updated standard significantly impacted the overall design for breaker failure protection. This increased the engineering design effort on this project and resulted in increased procurement and construction costs due to the requirement for additional components to adhere to the new standard.

**22. Install Support Structures C2 Capacitor Bank - Hardwoods (2015)**

**Budget: $199.3 Total: $79.7 Variance: ($119.6)**

This was a one year project that commenced in 2015 and was carried over and completed in 2016. During detailed engineering, a less expensive design was identified, resulting in savings for materials and construction.

**23. Replace Instrument Transformers – Various Sites (2013)**

**Budget: $1,501.3 Total: $1,190.3 Variance: ($311.0)**

This is a five-year project that commenced in 2013. The variance in 2016 expenditure is attributed to a small portion of the 2016 scope being rescheduled for 2017, due to the inability to secure the necessary equipment outages to perform the work. The remaining work on the project is expected to be completed in 2017 with no change to the overall project scope, budget or schedule.

**24. Increase 230 kV Transformer Capacity – Oxen Pond (2013)**

**Budget: ($200.2) Total: $98.3 Variance: $298.5**

This was a two year project that commenced in 2013 and was substantially completed through 2014 and 2015. It was carried over into 2016 for completion of project. The identified items were completed at a cost of $98.3k and the project was completed at an overall cost of 6.1% over the approved budget.

## 4.5 Transmission Projects

**25. Replace Aircraft Markers at Grand Lake Crossing – TL228 (2016)**

**Budget: $589.6 Total: $61.8 Variance: ($527.8)**

This is a two-year project that commenced in 2016 to replace four aircraft marker systems that are located on four 230 kV transmission crossing tower structures that span over a section of Grand Lake at Glover's Island. The variance in the first year expenditure is attributed to the materials procurement being deferred to Q1 of 2017. There is no change to the overall project scope, budget and completion date.

**26. Refurbish Anchors and Footings TL202 and TL206 – Bay d'Espoir to Sunnyside (2014)**

**Budget: $1,038.6 Total: $19.9 Variance: ($1,018.7)**

This project commenced in 2014. During project planning, it was decided to align construction with execution of the new transmission line between Bay d'Espoir and Western Avalon Terminal Stations, which is along the same corridor. The new line was approved by the Board under Order No. P. U. 53(2014) on December 12, 2014. The alignment of this

project with the construction of the new transmission line will result in overall cost savings to the project as well as a reduced environmental impact. Access roads for the new transmission line were originally anticipated to be completed in the fall of 2016; however, they will not be ready until 2017. For this reason, all construction work for this project will take place in 2017 instead of being spread across 2016 and 2017 as previously planned.

**27. 230 kV Transmission Line – Bay d'Espoir to Western Avalon (2015)**

**Budget: $77,669.1 Total: $59,317.8 Variance: ($18,351.3)**

The approved capital budget for 2016 (including 2015 carryover) was $77.7M. As of the end of 2016, the actual expenditure was $59.3M. As per the TL267 Monthly Status Update Report submitted to the PUB this project has undergone schedule and cash flow changes. The anticipated in service date has been accelerated from May 2018 to October 2017 with no change to the overall project budget.

## 4.6 Distribution Projects

**28. Provide Service Extensions - All Service Areas (2016)**

**Budget: $5,350.0 Total: $6,021.5 Variance: $671.5**

This is an annual budget that is based on data from past experience to provide service extensions to customers. The variance is primarily due to the Duley Lake Cottage Development, which had 26 customers request connections in 2016, at a cost of approximately $750k.

**29. Provide Service Extensions - All Service Areas - CIAC (2016)**

**Budget: ($200.0) Total: ($833.1) Variance: ($633.1)**

This is an annual budget that is based on past Contributions in Aid of Construction (CIAC) to provide service extensions to customers. The variance is primarily due to the Duley Lake Cottage area line extension and Hampden Tap – LCP Repeater site. As per Board Order P.U.16(2016), the Board approved $13,900 per customer for Duley Lake, and as of December 31, 2016, 26 customers have requested connections and provided their funding, resulting in contributions of approximately $350k. The installation of the Hampden Tap – LCP Repeater

site, executed by Hydro, carried a CIAC from the Muskrat Falls project of approximately $350k.

**30. Upgrade Distribution Systems - All Service Areas (2016)**

**Budget: $3,990.0 Total: $3,357.4 Variance: ($632.6)**

This is a one year project to provide distribution upgrades to customers, with a budget based on 2015 expenditures. The budget and actual expenditures in 2016 are shown by area in the table below. The variance is primarily due to less than expected distribution upgrade requests across all areas.

**Table 17**

| | Budget ($000) | Actual ($000) | Variance ($000) |
|---|---|---|---|
| Central | 1,910.0 | 1,702.3 | (207.7) |
| Northern | 1,150.0 | 937.1 | (212.9) |
| Labrador | 930.0 | 718.0 | (212.0) |
| Total | 3,990.0 | 3,357.4 | (632.6) |

**31. Construct Overhead Distribution Line – Pilley's Island to Long Island (2016)**

**Budget: $1,239.9 Total: $1,509.0 Variance: $269.1**

This was a one year project completed in 2016. During the budget stage, Hydro determined the least cost alternative to provide reliable power to Long Island was construction of an overhead distribution line. This was based on standard requirements for navigable waters, including a 24 m wire clearance over the water. After this project had been submitted for approval in the 2016 Capital Budget Application, the Canadian Coast Guard increased their wire clearance requirement to a minimum of 40 m to allow for their largest ice breaking vessel to safely pass underneath. This extra 16 m of clearance resulted in a change in the overhead design, and the project estimate increased to approximately $3.6 M dollars. The evaluation of project alternatives was revisited and an updated cost benefit analysis concluded that the least cost option was to replace the original submarine cables with new cables. The supply and installation of two submarine cables was completed.

**32. Upgrade Distribution Systems – Various Sites (2015-2016)**

**Budget: $575.8 Total: $710.8 Variance: $135.0**

This was a two year project that commenced in 2015 and is complete. The variance in the annual expenditure is attributable to work on the Bottom Waters distribution system that was planned to be performed under de-energized conditions but was carried out under energized conditions, to manage customer impact. This resulted in higher construction costs. The total project expenditure was within 7% of the approved budget.

## 4.7 Rural Generation Projects

**33. Overhaul Diesel Units - Various Sites (2016)**

**Budget: $2,078.4 Total: $2,526.4 Variance: $448.0**

This was a one year project completed in 2016. The project is part of an ongoing program to overhaul diesel engines at diesel generating plants to sustain reliability of the generating equipment. Project estimates are based on the projected number of engines that will reach the criteria for overhaul (20,000 hours of operation), and typical extent of refurbishment. The project variance is attributable to more extensive refurbishment than typically required for some of the engines, which was unknown until the engines were disassembled for the overhauls. Additionally, the higher United States dollar exchange rate resulted in an increase in material costs.

**34. Inspect Fuel Storage Tanks - Various Sites (2016)**

**Budget: $1,326.9 Total: $1,024.5 Variance: ($302.4)**

This was a one year project completed in 2016. The project is part of an ongoing program to inspect fuel storage tanks for diesel plants. After a detailed review and prioritization of the sites to be inspected in 2016, an update was made to the schedule as provided for in the Capital Budget Application for this project. Nain tank inspections were deferred to 2018, and Rigolet tank inspections were advanced to 2016. This change resulted in significant savings for contracted work in 2016. Additionally, after an external inspection, tanks in St. Brendan's were discovered to be leaking. As detailed in the 2016 Capital Budget Application, "Hydro

may inspect a higher priority tank should conditions change and defer a lower priority tank." The St. Brendan's tank, having failed, was replaced as it became a higher priority, given that fuel leakage was occurring. Other tanks inspected in 2016 did not require significant refurbishment, contributing to the project underspend.

**35. Install Fire Protection Systems – Cartwright and Nain (2016)**

**Budget: $3,030.7 Total: $782.8 Variance: ($2,247.9)**

This is a two year project that commenced in 2016. Design is complete and procurement is in progress. Most of the procurement and construction activity planned to be completed in late 2016 will now be completed in the first quarter of 2017. This schedule change was made to balance the overall capital work plan and to reduce the project schedule and delivery risks. There is no change to the overall project scope, budget or completion date.

**36. Upgrade Transformer Systems – Postville and Cartwright (2016)**

**Budget: $465.2 Total: $296.0 Variance: ($169.2)**

This was a one year project that has been carried over into 2017. The project is to replace transformers at Postville and Cartwright. The work at Postville was completed in 2016. The transformers purchased for Cartwright were determined to have incorrect secondary voltages and have been returned to the manufacturer for rewind. Construction is rescheduled for early 2017, ahead of the anticipated load growth (i.e. the transformers will be installed prior to start-up of the fish plant). There is no change to the overall project scope or budget.

**37. Additions For Load Growth – Various Sites (2016)**

**Budget: $883.4 Total: $190.4 Variance: ($693.0)**

This is a multi-year project that commenced in 2016. The annual variance in 2016 expenditure is attributable to delay in material purchases from Q4 2016 to Q1 2017. There is no change to the overall project scope, budget or completion date.

**38. Replace Unit 2038 – Mary's Harbour (2015)**

**Budget: $1,345.0 Total: $1,161.0 Variance: ($184.0)**

This was a two year project that commenced in 2015 and was completed as planned. A portion of the project contingency was not required.

**39. Install Fire Protection – L'anse Au Loup (2015)**

**Budget: $1,346.8 Total: $1,163.7 Variance: ($183.1)**

This was a two-year project that commenced in 2015 and was completed as planned. A portion of the project contingency was not required.

**40. Upgrade Diesel Plant Production Data Collection Equipment - Various (2014)**

**Budget: $283.8 Total: $510.6 Variance: $226.8**

This is a three year project that commenced in 2014. At commencement of the detailed engineering in year three for the sites that are included in year three of the project, it was determined that the design and construction would be more complex than the sites completed in the first two years of the project, which attributes to additional cost of the project for additional engineering, construction labour and materials. This prompted a review of the overall project scope and justification. From this review, it was determined that the diesel plant production data is not critical for three of the diesel plants that are connected to the Island Interconnected System (St. Anthony, Hawkes Bay, and Little Bay Islands), since these plants are not prime power. The diesel plant production data collection equipment work for these plants was subsequently removed from the project scope, mitigating the impact of cost overrun. The work is complete for all isolated diesel plants, with the exception of the construction for L'Anse au Loup, which has been carried into 2017. The project is expected to be completed in 2017 within 10% of the total project budget.

## 4.8 Properties Projects

**41. Upgrade Office Facilities and Control Buildings – Various Sites (2016)**

**Budget: $1,134.0 Total: $675.0 Variance: ($459.0)**

This was a one year project completed as planned in 2016. Publicly tendered prices for the construction at all three sites were lower than estimated.

**42. Replace Roof on Service Building – Bishop's Falls (2016)**

**Budget: $612.8 Total: $327.8 Variance: ($285.0)**

This was a one year project scheduled for completion in 2016, and carried over into 2017. Engineering and procurement are complete with construction partially completed in 2016. Due to factors including contractor resource issues, unforeseen design issues, and frequent inclement weather, the full roof replacement could not be completed before winter conditions set in. The building is weather tight and remaining roof work will be completed in the spring of 2017, when conditions allow. There is no change to the overall project scope or budget.

**43. Replace Accommodations and Septic System - Ebbegunbaeg (2015)**

**Budget: $1,456.6 Total: $811.2 Variance: ($645.4)**

This is a two year project that commenced in 2015 and is being carried over to 2017. The project scope includes installation of new accommodations and septic system, installation of a bridge at Noel Paul Brook, and access road upgrades. The bridge and road upgrades were completed as planned. The manufacturer was unable to deliver the new accommodations in accordance with the planned schedule. Delivery has been deferred to the spring of 2017 and construction will be completed in the summer of 2017. There is no change to the overall project scope or budget.

## 4.9 Metering Projects

**44. Install Automatic Meter Reading – Labrador West (2016)**

**Budget: $433.8 Total: $130.4 Variance: ($303.4)**

This is a two-year project that commenced in 2016. Engineering is complete and materials with long lead times have been ordered. The original budget estimate included receipt of materials in Q4 2016, but materials will be received in Q1 2017. There is no change to the overall project budget or completion date.

**45. Install Automatic Meter Reading – Various Sites (2015-2016)**

**Budget: $961.7 Total: $1,464.7 Variance: $503.0**

This is a two year project completed in 2016. The two primary drivers of the cost variance were higher than estimated equipment costs and higher than expected meter installation costs. Equipment costs were higher than budgeted due to a higher cost of the United States Dollar exchange rate, and estimates that were based on equipment costs of an earlier, less sophisticated generation of the equipment. Higher installation costs were incurred due to: greater than anticipated number of failed meter bases related to corrosive (salty) environmental conditions; low residential densities; long distances between communities; and the requirement for a dedicated line crew to ensure prompt restoration of service. An updated project cost estimate and updated assumptions for project benefits were used to re-evaluate the project. The updated cost-benefit analysis confirmed that the project remains the least cost alternative versus the status quo.

## 4.10 Tools and Equipment Projects

**46. Purchase Excavator – Bay d'Espoir (2016)**

**Budget: $312.0 Total: $187.0 Variance: ($125.0)**

The cost of the excavator was less than the original budget as it was a new product line for the supplier and a lower cost than historical similar purchases. The mulcher head attachment procurement was delayed to ensure the compatibility with the unit. The project will be completed by March 2017.

**47. Replace Off Road Track Vehicles – Unit 7861, Stephenville (2015-2016)**

**Budget: $398.9 Total: $176.8 Variance: ($222.1)**

This was budgeted as a two year project with the actual purchase completed in 2015 due to early availability and at a reduced cost.

## 4.11 Information Systems Projects

**48. Implement Industrial Billing Software - Hydro Place (2016)**

**Budget: $443.1 Total: $169.5 Variance: ($273.6)**

Vendor resources, when required, were unavailable resulting in a delay in commencement of the project and a carryover to 2017.

**49. Replace Peripheral Infrastructure - Various Sites (2016)**

**Budget: $611.3 Total: $507.3 Variance: ($104.0)**

An evaluation of the number of required printers indicated that some that were removed from service did not require replacement, thereby reducing the number of printers acquired.

**50. Upgrade Enterprise Storage Capacity – Hydro Place (2016)**

**Budget: $628.8 Total: $464.5 Variance: ($164.3)**

Resources were not available to work on the upgrade due to demands of other projects, causing a delay in execution; however, the Project is scheduled for completion in Q1 2017.

## 4.12 Transportation Projects

**51. Replace Vehicles and Aerial Devices - Various Sites (2016-2017)**

**Budget: $1,443.3 Total: $1,032.7 Variance: ($410.6)**

This is a two year project. There was a limitation on vehicle availability; however, the vehicles will be delivered in 2017.

## 4.13 Administrative

**52. Purchase Tools and Equipment less than $50,000 (2016)**

**Budget: $172.6 Total: $55.1 Variance: ($117.5)**

The overall project variance is primarily due to overall cost savings to the project due to items such as reduction in the estimated requirements for office equipment, and lower than estimated costs for some equipment.

## 4.14 Allowance for Unforeseen Items

**53. Allowance for Unforeseen Items**

**Budget: $3,000.0 Total: $13,666.9 Variance: $10,666.9**

The Allowance for Unforeseen is an annual allotment that permits Hydro to act expeditiously to deal with events affecting the electrical system which cannot wait for specific approval of the Board. Unforeseen expenditures for 2016 under this account include costs associated with Performing Upgrades to the Western Avalon Terminal Station Transformer T5 Tap Changer, Holyrood Units 1 and 2 – Boiler Re-Heat Tubes, Sally's Cove Transmission Line Reroutes, Bay d'Espoir-Penstock 1 and Access Roads Refurbishments. Reports on these items have been filed with the Board of Commissioners of Public Utilities.

## 4.15 Supplemental Projects

**54. TL 227 Distribution Line Sally's Cove L1 (2016)**

**Budget: $717.0 Total: $186.3 Variance: ($530.7)**

This is a two year supplemental project that commenced in 2016. In early 2016, a coastal landslide occurred south of Sally's Cove on the Northern Peninsula. This project is required to re-route a section of transmission line TL227 and distribution line L1 away from the high-risk zone surrounding the landslide. The variance in the first year expenditure is attributed to a delay in material delivery that was scheduled for November 2016, but was not received until early 2017. This late delivery of materials does not impact the construction schedule. There is no change to the overall project scope, budget or completion date.

**55. Refurbish Gas Generator Engines – Hardwoods and Stephenville (2016)**

**Budget: $3,047.1 Total: $2,538.7 Variance: ($508.4)**

This is a supplemental project approved in 2016 and carried into 2017. The engine for Hardwoods Gas Turbine was refurbished and successfully returned to service. The engine for the Stephenville Gas Turbine was refurbished and reinstalled, but experienced vibration issues during commissioning. The project is carried over into 2017 to assess and resolve the vibration issues.

**56. Unit 4 Turbine Primary Seal Clearance – Bay d'Espoir (2016)**

**Budget: $1,977.3 Total: $1,517.9 Variance: ($459.4)**

This project is complete. This was a supplementary project approved and executed in 2016. The contract cost to complete the refurbishment of the turbine seal (concrete grouting and seal machining) of the turbine was less than original estimate. The variance is also attributed to the contingency funds not being required.

**57. CT – Combustion Inspection and Overhaul - Holyrood (2016)**

**Budget: $4,738.3 Total: $3,967.2 Variance: ($771.1)**

This is a supplemental project approved and completed in 2016. The variance from the planned expenditure is primarily attributed to the fact that the contingency was not required.

**58. Purchase Critical Spares Generation Stations (2015)**

**Budget: $1,536.3 Total: $1,226.4 Variance: ($309.9)**

This is a supplemental project approved in 2015 for procurement in 2016. The variance was due to material costs being lower than budgeted and the contingency not being required.

**59. Replace Rectifier Transformers – Holyrood Units 1 and 2 (2015)**

**Budget: $756.2 Total: $870.4 Variance: $114.2**

This is a two-year project that commenced in 2015 and is complete. The project variance is due to higher than anticipated remediation costs required for the proper disposal of the removed rectifying transformers for Units 1 and 2.

**60. Transformer VBN T1 Major Internal Assessment (2015)**

**Budget: $500.1 Total: $345.5 Variance: ($154.6)**

This is a supplemental project that was substantially completed in 2015, with final testing in 2016. The project is now complete. The scope included a major internal assessment of a transformer. The budget included an allowance for refurbishment, but the level of refurbishment estimated was not required.

**61. Labrador West Transmission Project – Construction Phase (2014)**

**Budget: $329,592.1 Total: $12,376.8 Variance: ($317,215.3)**

In 2014, the provincial Government approved the construction of the third transmission line in Labrador to help supply power for planned new development in Labrador West, such as the Kami Iron Ore Project, and improved reliability for all customers in the region. In September 2014, work on the line was temporarily suspended until completion of Alderson's financing plan which resulted in overall expenditures being lover than budgeted. All project costs to date, including the 2016 Interest During Construction costs, are covered by the security Alderon has already provided. Construction will proceed should additional funding be secured.

**62. Purchase of 12 MW Diesel Generation - Holyrood**

**Budget: $4,700.0 Total: $3,784.0 Variance: ($916.0)**

This supplemental capital project was initially envisioned as a one year project. Once approved, the purchase of the 6 diesel engines was completed in 2016. The remaining scope to make the new infrastructure permanent, including the environmental modeling and

changes to the exhaust stacks, could not be completed in the available time frame and was carried over to 2017. There is no change to the original budget.

## 4.16 Units 1 and 2 Boilers Lower Re-heater Boiler Tube Replacement and Reliability Improvements, Holyrood Thermal Generating Station

This supplemental project was approved and completed in 2016, with the actual expenditure within 1% of the approved project budget. The project scope included replacement of boiler lower re-heater tubes and a number of other reliability improvements. Item 10 of the reliability improvements (Section 3.3.2. of the supplementary application) was stated as:

> "While Hydro has not currently identified additional equipment for immediate replacement, it is possible an additional component may require replacement during the annual outages. Hydro proposes that any item, material in dollar value, that meets capitalization criteria, is required to be replaced to mitigate an unplanned outage in the coming winter season, and that can be replaced within this project's contingency, would be replaced and communicated to the Board via the year end Capital Expenditures Variance report."

The Board of Commissioners of Public Utilities approved this project with Board Order No. P.U. 19(2016) and ordered that: "Hydro shall report on the contingency expenditures associated with additional component replacements arising from this project, setting out in detail the work which was done, the associated costs and the justification, as a part of its year-end capital expenditures variance report."

Hydro identified and completed four items under these criteria, as summarized in Table 18.

**Table 18**

| Item | Description | Cost ($,000) | Scope of Work and Justification |
|---|---|---|---|
| 1 | Boiler Floor Tube Refurbishment Unit 3 | 47.3 | This work was based on an ultrasonic thickness inspection that was carried out that found pitting in the tubing, and tubing approaching minimum wall thickness. Welding refurbishment was completed to bring these tubes to an acceptable level. |
| 2 | Thermal Performance Study on Unit 3 | 210.9 | This work included a review of Holyrood de-rate assessment analysis to identify any derating that should be applied to the power boilers, after the 2016 annual outages and the planned tube replacements were made. Tube samples were taken and specialized non-destructive examination were completed to confirm or deny the theoretical analysis, which induced the de-rate on Unit 3. The results of this work ensured that the de-rate of Unit 3 could be lifted. This would allow Hydro to operate reliably as planned to the end of service in 2021. |
| 3 | Steam Coil Air Heaters (SCAH) (Units 1 & 2) | 124.4 | This work was based on a condition identified during the unit outages. The SCAH were replaced because they were determined to be fouled and damaged beyond repair. Replacement was necessary prior to unit start-up. |
| 4 | Corrosion Mapping for 9 Air Receivers | 73.0 | During replacement of the #2 air compressor (an approved reliability scope item for this project), it was determined that a level 2 condition assessment of the nine associated air receivers (storage tanks) was required. This assessment was completed to ensure the long term reliability of the compressed air system. |
| TOTAL | | 455.6 | |

## 5.0 Capital Budget Verses Actual Expenditures 2007 – 2016

Table 19 provides a summary of Hydro's Capital Budget Variances for the years 2007-2016.

**Table 19**

**Capital Budgets/Expenditures 2007-2016**

| Year | Budget | Actual Expenditures | Variance | Percentage Variance |
|---|---|---|---|---|
| 2007 | 43,304 | 35,669 | 7,635 | 17.6% |
| 2008 | 53,579 | 46,246 | 7,333 | 13.7% |
| 2009 | 61,544 | 54,152 | 7,392 | 12.0% |
| 2010 | 63,297 | 55,553 | 7,744 | 12.2% |
| 2011 | 67,454 | 63,116 | 4,338 | 6.4% |
| 2012 | 93,840 | 77,252 | 16,588 | 17.7% |
| 2013 | 116,373 | 84,755 | 31,618 | 27.2% |
| 2014 | 280,601 | 204,728 | 75,873 | 27.0% |
| 2015 | 311,177 | 125,119 | 186,058 | 59.8% |
| 2016 | 350,601 | 203,941 | 146,660 | 41.8% |

The 2016 variance in actual expenditures compared to budget, an underspend of $145.9M, is attributable to two major projects, the 230 kV transmission line from Bay d'Espoir to Western Avalon (TL 267 – Variance #27), and the 230 kV line from Churchill Falls to Wabush (Labrador West Transmission Line – Variance #61). TL 267 includes a project underspend of $18.4M in relation to the original 2016 budget. The Labrador West Transmission Line work is suspended until completion of Alderson's financing plan for the Kami mine. Therefore, $129.0M associated with work that was planned to be completed in 2016 on the Labrador West Transmission Line was not completed due to a temporary suspension of the work in September 2014. These two projects account for approximately $147M.

## 6.0 Carryover Report

Table 20 provides a summary listing of the carryovers from 2010-2017.

[rest of page intentionally left blank]

**Table 20**

**2016 Carryover Report**
**For the Year Ending December 31, 2016**
**($000)**

| Project Name | PUB Approved Budget 2016 | Revised Budget 2016 | Total Actual Expenditures 2016 | Carryover Amount | Original Completion Year |
|---|---|---|---|---|---|
| Replace Pump House and Associated Equipment - Bay d'Espoir | 522.5 | 408.2 | 128.6 | 279.6 | 2016 |
| Upgrade Equipment Doors - Various Sites | 0.0 | 162.1 | 115.4 | 46.7 | 2015 |
| Replace UPS Systems - Hydro Place | 889.8 | 889.8 | 928.6 | (38.8) | 2016 |
| Install Hydrometeorological Equipment - Various Sites | 314.1 | 314.1 | 4.3 | 309.8 | 2016 |
| Overhaul Turbine/Generator Units #6 and #7 - Bay d'Espoir | 1,213.5 | 466.4 | 410.2 | 56.2 | 2016 |
| Refurbish Gas Generator Engines - Hardwoods and Stephenville | 0.0 | 3,047.1 | 2,538.7 | 508.4 | 2016 |
| Purchase Excavator - Bay d'Espoir | 312.0 | 222.0 | 187.0 | 35.0 | 2016 |
| Replace Roof on Service Building – Bishop's Falls | 612.8 | 612.8 | 327.8 | 285.0 | 2016 |
| Replace Radiator Unit 2029 Makkovik | 0.0 | 49.0 | 27.5 | 21.5 | 2016 |
| Upgrade Transformer Systems - Postville and Cartwright | 465.2 | 465.2 | 296.0 | 169.2 | 2016 |
| Implement Industrial Billing Software - Hydro Place | 443.1 | 443.1 | 169.5 | 273.6 | 2016 |
| Upgrade Enterprise Storage Capacity - Hydro Place | 628.8 | 628.8 | 464.5 | 164.3 | 2016 |
| Cost Recoveries | (291.6) | (291.6) | (215.5) | (76.1) | 2016 |
| Upgrade Server Technology Program - Hydro Place | 492.5 | 492.5 | 451.1 | 41.4 | 2016 |
| Cost Recoveries | (228.5) | (228.5) | (209.3) | (19.2) | 2016 |
| Replace Station Service Breakers - Cat Arm | 363.4 | 362.2 | 185.9 | 176.3 | 2016 |
| Replace Accommodations and Septic System - Ebbegunbaeg | 1,061.4 | 1,456.6 | 811.2 | 645.4 | 2016 |
| Upgrade Diesel Plant Production Data Collection Equipment-Various | 280.7 | 653.8 | 510.6 | 143.2 | 2016 |
| Purchase of 12 MW Diesel Generation - Holyrood | 0.0 | 4,700.0 | 3,784.0 | 916.0 | 2016 |
| Install Automated Meter Reading - Labrador West | 433.8 | 433.8 | 130.4 | 303.4 | 2017 |
| Replace Battery Banks and Chargers - Various Sites | 425.0 | 425.0 | 365.7 | 59.3 | 2017 |
| Replace MDR 4000 Microwave Radio East - Various Sites | 77.4 | 77.4 | 113.4 | (36.0) | 2017 |
| Replace Air Conditioners - Various Sites | 39.9 | 39.9 | 51.2 | (11.3) | 2017 |
| Replace Powerline Carrier - Various Sites | 73.4 | 73.4 | 77.4 | (4.0) | 2017 |
| Upgrade Telecontrol Facilities - Sandy Brook Hill | 101.6 | 101.6 | 81.7 | 19.9 | 2017 |
| Replace Control Room/Communications Room Air Conditioning – Hinds Lake | 41.3 | 41.3 | 31.0 | 10.3 | 2017 |
| Refurbish Station Water System – Upper Salmon | 96.6 | 96.6 | 38.3 | 58.3 | 2017 |
| Upgrade Work – Cat Arm | 558.3 | 558.3 | 240.4 | 317.9 | 2017 |
| Rehabilitate Shoreline Protection – Cat Arm | 112.2 | 112.2 | 104.7 | 7.5 | 2017 |
| Replace PH1 Station Service Transformer – Bay d'Espoir | 46.7 | 46.7 | 45.0 | 1.7 | 2017 |
| Replace Spherical By-Pass Valves Units 1 and 2 – Bay d'Espoir | 183.6 | 183.6 | 154.8 | 28.8 | 2017 |
| [ | | | | | } |
| Replace Instrument Transformers – Various Sites | 1,511.7 | 1,501.3 | 1,190.3 | 311.0 | 2017 |
| Replace Surge Arrestors – Various Sites | 144.4 | 144.4 | 175.1 | (30.7) | 2017 |

| | | | | | |
|---|---|---|---|---|---|
| Replace Protective Relays – Various Sites | 700.6 | 700.6 | 1,425.8 | (725.2) | 2017 |
| Replace Disconnect Switches – Various Sites (2016-2017) | 646.9 | 646.9 | 131.7 | 515.2 | 2017 |
| Upgrade Digital Fault Recorders – Various Sites | 197.9 | 197.9 | 221.2 | (23.3) | 2017 |
| Upgrade Data Alarm Systems – Various Sites | 74.4 | 74.4 | 49.7 | 24.7 | 2017 |
| Install Breaker Failure Protection – Various Sites | 65.7 | 65.7 | 81.8 | (16.1) | 2017 |
| Install Fire Protection in 230 kV Stations – Bay d'Espoir | 200.0 | 200.0 | 91.4 | 108.6 | 2017 |
| Upgrade Warehouse Lighting – Bishop's Falls | 15.2 | 15.2 | 28.1 | (12.9) | 2017 |
| Replace Fuel Piping – Hardwoods and Stephenville | 44.8 | 44.8 | 11.6 | 33.2 | 2017 |
| Upgrade Human Machine Interface – Various Sites | 114.0 | 114.0 | 125.3 | (11.3) | 2017 |
| Install Variable Frequency Drives – Grey River | 46.9 | 46.9 | 49.7 | (2.8) | 2017 |
| Replace Vehicles and Aerial Devices – Hydro System (2016-2017) | 1,443.3 | 1,443.3 | 1,032.7 | 410.6 | 2017 |
| Purchase Vehicles and Aerial Devices – Various Sites | 382.5 | 382.5 | 470.4 | (87.9) | 2017 |
| Refurbish Anchors and Footings TL202 and TL206 – Bay d'Espoir to Sunnyside | 1,038.4 | 1,038.6 | 19.9 | 1,018.7 | 2017 |
| Replace Aircraft Markers at Grand Lake Crossing – TL228 | 589.6 | 589.6 | 61.8 | 527.8 | 2017 |
| Upgrade Distribution Systems – Various Sites (2016-2017) | 285.6 | 285.6 | 361.8 | (76.2) | 2017 |
| Additions for Load Growth – Various Sites | 883.4 | 883.4 | 190.4 | 693.0 | 2017 |
| Install Fire Protection Systems – Cartwright and Nain | 3,030.7 | 2,339.9 | 782.8 | 1,557.1 | 2017 |
| Replace Programmable Logic Controllers – Various Sites | 346.0 | 315.7 | 345.5 | (29.8) | 2017 |
| TL 227 Distribution Line Sally's Cove L1 | 0.0 | 717.0 | 186.3 | 530.7 | 2017 |
| Upgrade Terminal Station for Mobile Substation – Cow Head | 40.0 | 40.0 | 27.5 | 12.5 | 2017 |
| Replace Air Conditioning Units 8 and 14 – Hydro Place | 34.6 | 34.6 | 31.0 | 3.6 | 2017 |
| Replace Site Facilities – Bay d'Espoir | 928.3 | 928.3 | 270.4 | 657.9 | 2018 |
| Upgrade Powerhouse Building Envelope – Holyrood | 2,723.8 | 2,723.8 | 2,239.9 | 483.9 | 2018 |
| 230 kV Transmission Line – Bay d'Espoir to Western Avalon | 75,284.3 | 85,426.4 | 59,317.8 | 26,108.6 | 2018 |
| Construct 230 kV Transmission Line – Soldiers Pond to Hardwoods | 3,699.0 | 3,699.0 | 3,501.6 | 197.4 | 2018 |
| Upgrade Microsoft Project – Hydro Place | 366.6 | 366.6 | 352.1 | 14.5 | 2018 |
| Upgrade Circuit Breakers – Various Sites (2016-2020) | 6,969.1 | 6,969.1 | 5,599.5 | 1,369.6 | 2020 |
| | | | | 38,255.7 | |

## 7.0 Safety Hazards

In Board Order No. P.U. 38(2010) 2011 Capital Budget, the Board directed Hydro to include an explanation in Hydro's annual. Please see the following Table 21 for projects undertaken in 2016.

**Total Approved Budget:** **$199,300**
**Total Expenditure:** **$175,378**

[rest of page intentionally left blank]

**Table 21**

| Safety Hazards | | | |
|---|---|---|---|
| **Project Title/Location** | **Expenditure** | **Safety Hazard Identified** | **Project Scope** |
| Holyrood Unit 3 – Upgrade Continuous Blowdown Throttling Valve | $57.1 | Prior to this improvement, the piping and manual throttling valve configuration for the boiler blowdown tank for Holyrood Unit 3 did not allow quick egress in the event that a failure occurred, resulting in emitted steam. If a release occurred, steam would have quickly filled the area, creating a visibility hazard and making egress more difficult. In addition to this concern, the valve location required an operator to extend beyond the range of safe ergonomics to operate the valve. As this throttling valve is required to be continuously adjusted while the boiler is online, the ability to operate the valve in a safe location, using proper ergonomics is required. | To address the hazard, an upgrade to the Unit 3 continuous blowdown tank throttling valve was completed. The manually operated valve was upgraded to an actuated throttling valve, which allows the operator to adjust it while outside the valve location. This removes the plant operator from any potential safety or ergonomic hazards, eliminating the need for a plant operator to enter an unsafe location while the boiler is online. The valve was equipped with a digital controller that adjusts the position of the throttling valve; this allows the operator to verify the valve is operating correctly. |

| Safety Hazards | | | |
|---|---|---|---|
| **Project Title/Location** | **Expenditure** | **Safety Hazard Identified** | **Project Scope** |
| Holyrood Unit 3 – Upgrade Main Steam Seat Drain Valves | $25.3 | Prior to this improvement, a plant operator had to descend a ladder to operate a main steam valve which is located above the seat drain valves. The existing piping and valve configuration did not allow quick egress in the event that a failure occurred, resulting in emitted steam. If a release occurred, steam would quickly fill the area, creating a visibility hazard and making egress more difficult. | To address this hazard, an upgrade to the two Unit 3 main steam stop valves was completed. The existing y-pattern main steam valves were replaced with t-pattern valves complete with handle extensions. This allows operation from the plant floor |

| | | | |
|---|---|---|---|
| | | | level and eliminates the need for a plant operator to enter a hazardous location. |
| Holyrood – Install Chemical Shower & Eye Wash Station Water Heaters | $93.0 | Prior to this improvement, equipment did not include any form of heating for the domestic water used by the critical emergency showers and eye wash stations at the Holyrood Thermal Generating Station. Emergency showers and eye wash stations are required safety equipment and have a defined required performance, as outlined in ANSI Z358.1-2014. Emergency showers must provide tepid water, between 16°C and 38°C, with a minimum flow of 20 gallons per minute for the required decontamination time. The chemical showers currently meet flow requirements but provided water at 4°C to 12°C, depending on the seasonal temperature of Quarry Brook, the water source. Based on the treatment requirements of the chemical exposures, the minimum required shower time is 20 minutes creating a safety hazard due to the exposure time at potentially cold temperatures. | To address this hazard, water heaters and automatic mixing valves were installed for critical emergency showers and eye wash stations at the Holyrood Thermal Generating Station. |

**Exhibit 7 - Annual Reports on Key Performance Indicators**

**A REPORT TO**
**THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES**

# 2014 ANNUAL REPORT
**ON**
# KEY PERFORMANCE INDICATORS

*Pursuant to Order No. P.U. 14(2004)*

## NEWFOUNDLAND AND LABRADOR HYDRO

## TABLE OF CONTENTS

1 Introduction ..... 3
2 Overview of Key Performance Indicator Results ..... 4
2.1 Overview ..... 4
2.2 Performance in 2014 versus 2014 Target ..... 5
3 Performance Indices ..... 6
3.1 Reliability Performance Indicators ..... 6
*3.1.1 Reliability KPI: Generation* ..... 6
*3.1.2 Reliability KPI: Transmission* ..... 10
*3.1.3 Reliability KPI: Distribution* ..... 17
*3.1.4 Reliability KPI: Other* ..... 23
3.2 Operating Performance Indicators ..... 26
*3.2.1 Operating KPI: Generation* ..... 26
3.3 Financial Performance Indicators ..... 29
3.4 Customer-Related Performance Indicators ..... 34

Appendix A: Rationale for Hydro's 2014 KPI Targets
Appendix B: Computation of Weighted Capability Factor and Factors Impacting Performance
Appendix C1: Significant Transmission Events – 2014
Appendix C2: Significant Distribution Events – 2014 (Excluding Fourth Quarter)
Appendix C3: Underfrequency Load Shedding Events (Excluding Fourth Quarter)
Appendix D: List of U.S.-Based Peers for Financial KPI Benchmarking

# 1 Introduction

In Order No. P.U. 14(2004), the Board required Newfoundland and Labrador Hydro (Hydro) to file appropriate historic, current and forecast comparisons of reliability, operating, financial and other Key Performance Indicators (KPIs). These were ordered to be filed with Hydro's annual financial report, commencing in 2004.

In compliance with the above Order, Hydro has 16 individual KPIs within the following four general categories: Reliability; Operating; Financial; and Customer-Related.

Within each of these categories, KPI data is reported on a historic basis for Hydro. Where appropriate, KPIs are subcategorized based on whether they relate to generation, transmission, distribution or overall corporate activity. For most of the Reliability KPIs, data from the Canadian Electricity Association (CEA) is provided in this report, as has been the case in prior years. At the time of this report, CEA data has been published only to 2013. CEA data is unavailable for underfrequency load shedding, a reliability KPI, as this measure is unique to Hydro's Island Interconnected System. In the Operating category, the KPIs used to measure performance relate to two specific facilities within Hydro's system: Bay d'Espoir and Holyrood. For these two generation plants, performance is measured and compared on a year-over-year basis.

Section 2 of this report provides an overview of Hydro's KPI performance in 2014 compared with the prior year as well as a comparison of actual KPI results compared with targets.

Section 3 of this report provides a detailed analysis of each individual KPI within the four categories named above in Section 3. In addition, it provides fourth quarter data for transmission and distribution reliability which is routinely included in Hydro's quarterly regulatory reports.

Section 3.3 Financial Performance Indicators are not yet available but will follow after the audited financial statements are available. In addition, it provides fourth quarter data for transmission and distribution reliability which is routinely reported in quarterly regulatory reports.

The 2014 financial data and 2015 targets in Section 4 Data Table of Key Performance Indicators are not available at this time. This section will be re-filed after the financial data is available and the 2015 target levels have been established.

# 2 Overview of Key Performance Indicator Results

## *2.1 Overview*

A number of key indices measured by Hydro showed improvement when compared to 2013 or the targets for 2014. All indices are discussed in the following sections of this Appendix. Some highlights are below.

- Residential Customer Satisfaction was 84% in 2014 compared to a target of 80%.

- There was an improvement in generation availability in 2014 when compared to 2013. Hydro's Weighted Capability factor, which measures generating unit availability, was 79.7% in 2014 compared to 75.5% in 2.13. The availability of the Holyrood thermal plant improved to 63% in 2014, compared to 46% in 2013. The availability of gas turbines improved to 80%, compared to 62% in 2013. The availability of Hydro's hydraulic plants was 88% in 2014, compared to 92% in 2013. With the exception of Unit 6 at the Bay d'Espoir generating station, Hydro's hydraulic units' availability was consistent with historic performance. Impacting on the overall hydraulic unit availability was a failure of a rectifying transformer Unit 6 and the subsequent failure of the spare during the winter months. These transformer issues resulted in an extended outage to Unit 6 that impacted hydraulic availability.

- Derating-Adjusted Forced Outage Rate (*DAFOR - measures the percentage of the time that a unit or group of units is unable to generate at its Maximum Continuous Rating (MCR) due to forced outages*)
- Hydro's DAFOR performance was 8.2% in 2014, compared to 13.7% in 2013.
- The frequency of transmission delivery point outages improved in 2014, compared to 2013. The forced outage component of transmission delivery point outages also improved in 2014, compared to 2013.
- The hydraulic conversion factor at Bay d'Espoir improved in 2014 from 2013. In 2014, the water levels experienced in the reservoirs were generally lower. This allowed greater output flexibility resulting in improved water utilization at the Bay d'Espoir plant. The target was met in 2014 for this measure.

Other indices did not exhibit the same improvement in comparison to the 2013 performance or target.

- There were 14 underfrequency load shedding events in 2014. This is compared to a 2014 target of six events and a 2013 performance of seven events.
- Transmission and Distribution reliability were impacted by the significant disturbances on January 4 and 5 which were precipitated by a transformer failure at Sunnyside Terminal Station and subsequent breaker failures. Additionally, there were a number of severe weather related outages, primarily occurring in the Central region in February and April.

The 2014 operating KPI for energy conversion at Holyrood was primarily impacted by the low heating content in the fuel consumed at the plant, in addition to a lower average unit loading.

A review of all indices are contained in the following sections.

## *2.2 Performance in 2014 versus 2014 Target*

The table below summarizes Hydro's KPI performance in 2014. The rationale for the 2014 targets was summarized in the February 2014 report to the Board entitled *2013 Annual Report on Key Performance Indicators*. The 2014 rationale is included in this report as Appendix A.

| Category | KPI | Units | 2014 Target | 2014 Results |
|---|---|---|---|---|
| Reliability | Weighted Capability Factor (WCF) | % | 84.0[1] | 79.7 |
| | DAFOR | % | 2.7 | 8.2 |
| | T-SAIDI | Minutes/Point | 180[2] | 458 |
| | T-SAIFI | Number/Point | 1.6 | 3.8 |
| | T-SARI | Minutes/Outage | 114 | 121 |
| | SAIDI | Hours/Customer | 5.9 | 19.56 |
| | SAIFI | Number/Customer | 3.6 | 6.77 |
| | Underfrequency Load Shedding | # of events | 6 | 14 |
| Operating | Hydraulic CF | GWh/MCM | 0.433 | 0.433 |
| | Thermal CF | kWh/BBL | 615 | 584 |
| Financial | Controllable Unit Cost | $/MWh | Not Applicable | 18.09 |
| Other | Customer Satisfaction (Residential) | Max=100% | 80% | 84% |

[1] The Weighted Capability Factor target is based on planned annual maintenance outages, an allowance for other short duration maintenance outages and targeted forced outage durations.
[2] Transmission and distribution reliability targets were set on combined planned and unplanned outages.

# 3 Performance Indices

The following defines and describes detailed Key Performance Indicator data within four general categories: Reliability, Operating, Financial, and Customer-Related.

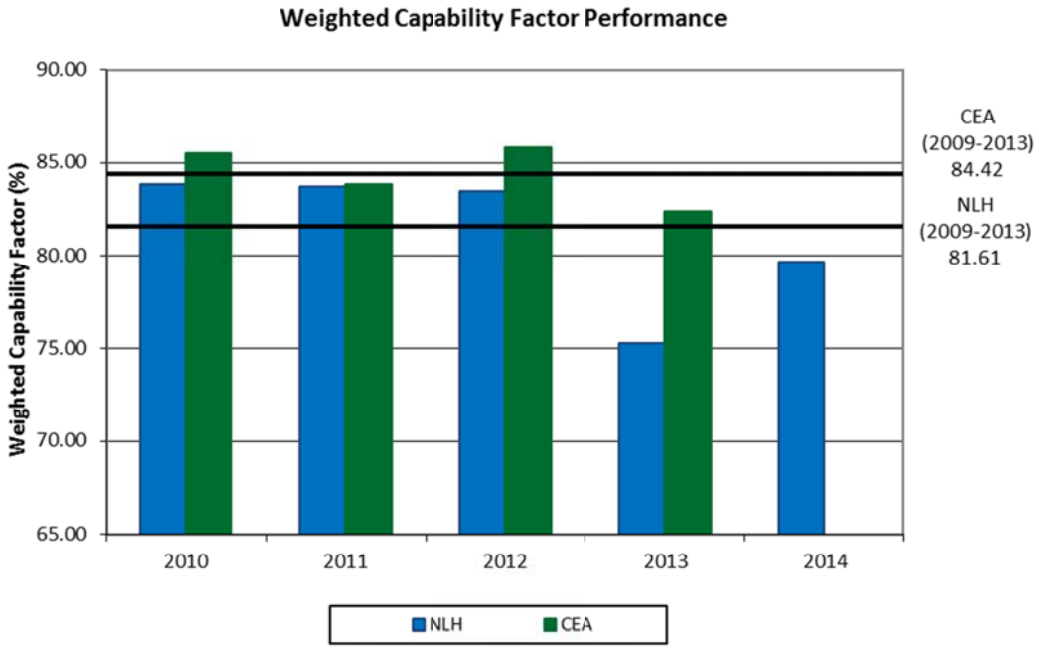
## *3.1 Reliability Performance Indicators*

Hydro monitors reliability performance with eight separate metrics. These metrics have been divided into the following subcategories: Generation, Transmission, Distribution, and Other.

### *3.1.1 Reliability KPI: Generation*

**3.1.1 a) Weighted Capability Factor (WCF) –** *a reliability KPI for generation assets that includes Hydro's thermal, gas turbine and hydroelectric generation assets on the Island and Labrador Interconnected Systems. The WCF measures the percentage of the time that a unit or a group of units is available to supply power at maximum continuous generating capacity. The factor is weighted to reflect the difference in generating unit sizes, meaning larger units have a greater impact on this measure.*

In 2014, Hydro's WCF was 79.7%, compared to 75.5% in 2013 and a target of 84%. The 2009 to 2013 Hydro five-year average is 81.6%. The annual target for availability includes the time that units are out for maintenance. Therefore, the capability in any year is affected by the maintenance and capital work planned for that year.



Thermal unit WCF was 63% in 2014 compared to 46% in 2013. The overall 2014 Thermal WCF target was 67%. Holyrood Unit 3 had a capability factor of 69%, Unit 2 had a capability factor of 61%, and Unit 1 had a capability factor of 60%. Holyrood unit maintenance and planned outages were completed within the intended timeframes. A Holyrood unit was operated throughout the summer months in 2014 in order to support the transmission into the Avalon Peninsula.

Overall, the hydraulic unit WCF performance was 88%, compared to 92% in 2013 and a target of 92%. The primary driver for the 88% WCF is the failure of two rectifying transformers on Bay d'Espoir Unit 6. The in-service rectifying transformer failed on January 30 and the unit was returned to service on February 1, using the spare transformer. This spare transformer failed on February 17 and, with no other spares available, a new transformer was required to be built. The unit was returned to service on August 5 with a new rectifying transformer. Removing the impact of the rectifying transformer failure from the hydraulic WCF, results in an annual hydraulic WCF outcome which is approximately equal to the target of 92%.

Gas turbine availability improved to 80% in 2014 from 62% in 2013. The 2014 gas turbine WCF target was 86%.

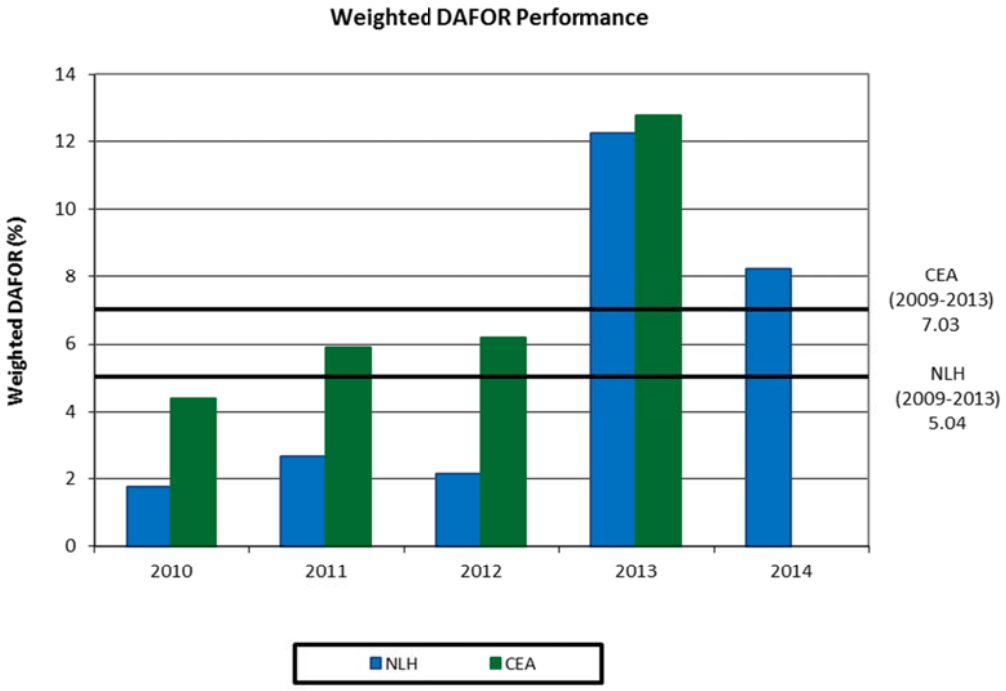
Calculation details for weighted capability as well as a list of factors that can impact KPI performance are included in Appendix B of this report.

**3.1.1 b) Weighted Derating-Adjusted Forced Outage Rate (DAFOR)** - *a reliability KPI for generation assets that includes Hydro's thermal and hydroelectric generation assets on the interconnected systems[3]. DAFOR measures the percentage of the time that a unit or group of units is unable to generate at its Maximum Continuous Rating (MCR) due to forced outages. The KPI is weighted to reflect differences in generating unit sizes.*

In 2014, Hydro's weighted DAFOR was 8.2%, compared to 12.2% in 2013 and a target of 2.7%. The thermal DAFOR for 2014 was 13.7%, compared to 36.6% in 2013 and a target of 8.0%. The variance from target for the thermal units was not attributed to any major failures on any one unit, but rather a series of minor failures of one to three days in duration. The hydraulic DAFOR was 5.9% compared to 0.55% in 2013 and a target of 0.6%. The hydraulic DAFOR was impacted by the failures of the rectifying transformers on Bay d'Espoir Unit 6, as described in the previous section. These failures contributed approximately 83% of the overall 2014 hydraulic DAFOR.

Hydro's overall weighted DAFOR for the period 2009 to 2013 is 5.0%, 2.0% better than the equivalently weighted national average of 7.0% for the same period.

[3] DAFOR is not applicable to the gas turbines because of the gas turbines' low operating hours.




### 3.1.1 c) Generation Equipment Performance

The table below highlights the various performance indices for Hydro's generation facilities. Indices for 2013 and for the latest CEA national average for the period 2009-2013 are included for comparison.

**Generation Performance Indices**

| Index | | Hydro | Thermal | Gas Turbine |
|---|---|---|---|---|
| **Failure Rate** | NLH 2014 | 2.67 | 11.72 | 160.36 |
| (Forced Outages per 8,760 | NLH 2013 | 1.42 | 8.84 | 144.46 |
| operating hours) | CEA '09-'13 | 2.01 | 7.12 | 22.39 |
| **Incapability** | NLH 2014 | 11.30 | 36.41 | 17.36 |
| **Factor** | NLH 2013 | 7.97 | 53.96 | 35.64 |
| (Percent of Time) | CEA '09-'13 | 10.27 | 26.76 | 13.33 |
| **Derating Adjusted Forced** | NLH 2014 | 5.87 | 13.74 | |
| **Outage Rate** | NLH 2013 | 0.55 | 36.58 | |
| (Percent of Time) | CEA '09-'13 | 4.17 | 12.69 | |
| **Utilization** | NLH 2014 | | | 14.34 |
| **Forced Outage** | NLH 2013 | | | 28.07 |
| **Probability** (Percent of Time) | CEA '09-'13 | | | 13.07 |

**Hydraulic Unit Performance**

The extended forced outage to Unit 6 at Bay d'Espoir resulting from the rectifying transformer failures impacted all hydraulic unit measures in 2014, when compared to 2013 and to the national five year averages. In excluding these transformer failures, the performance of the remaining hydraulic units was consistent with past performance.

**Thermal Unit Performance**

Thermal unit performance improved in 2014 in the areas of Incapability Factor and DAFOR, when compared to 2013. Failure rate performance in 2014, when compared to 2013, was impacted by a series of minor vibration issues at Unit 2 which occurred during startup of the unit following its annual maintenance. These vibration issues were addressed in the fourth quarter of 2014.

**Gas Turbine Unit Performance**

The Incapability Factor and Utilization Forced Outage Probability (UFOP) performance of Hydro's gas turbines improved in 2014 when compared to 2013. In comparison to the national average, the Failure Rate is high due to the normally low operating hour requirements of Hydro's gas turbines. Units across the country are often used on a more frequent basis and therefore their failure rate percentage is lower than those of a standby unit. Of particular importance to Hydro's gas turbines fleet is the UFOP which measure the degree to which a standby unit can be called upon to supply load when requested. The UFOP in 2014 was 14.3%, compared to 28.1% in 2013 and the CEA five year average of 13.1%.

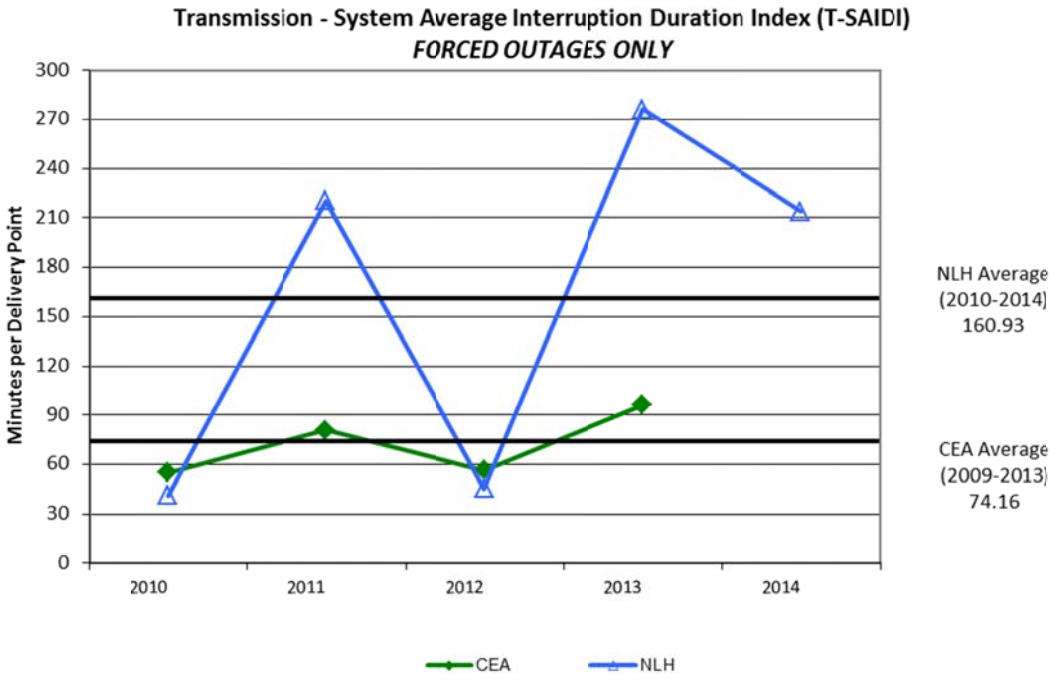
### *3.1.2 Reliability KPI: Transmission*

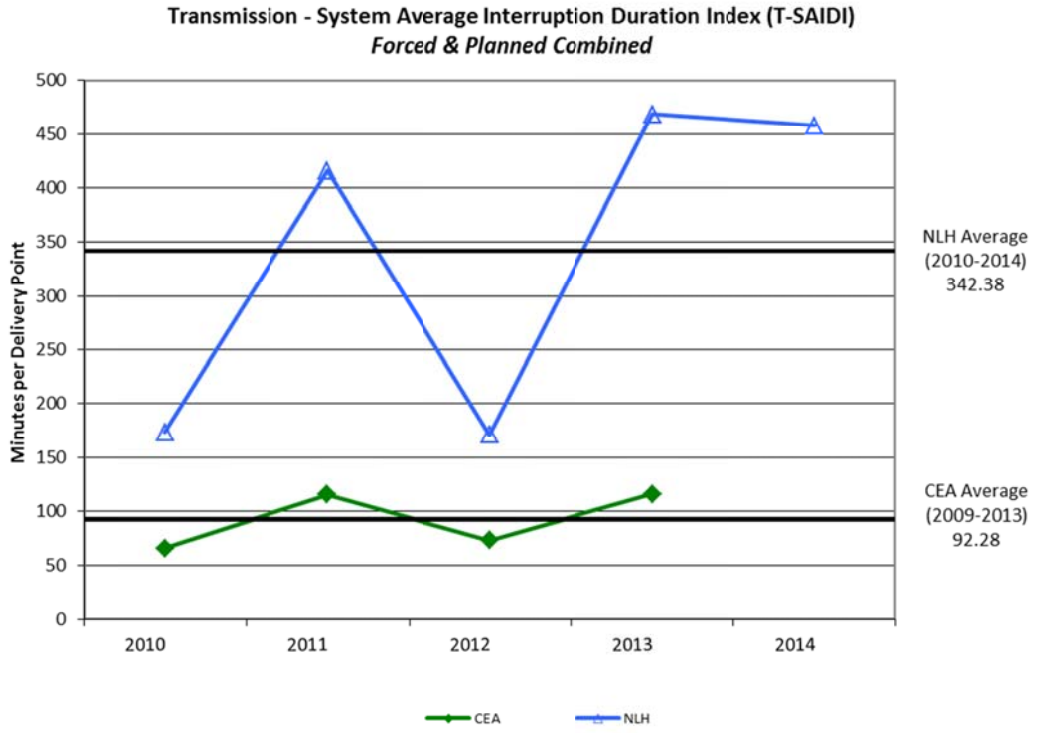
**3.1.2 a) Transmission System Average Interruption Duration Index (T-SAIDI)** - *reliability KPI for bulk transmission assets which measures the average duration of outages in minutes per delivery point.*

The fourth quarter T-SAIDI was 96 minutes per delivery point (forced and planned combined) compared to 120 minutes in 2013.

The total 2014 T-SAIDI was 458 minutes per delivery point compared to a 2013 total of 469 minutes per delivery point and a target of 180 minutes per delivery point. The forced outage duration in 2014 was 214 minutes, compared to 277 minutes in 2013 and a 2014 target of 53 minutes per delivery point. The planned outage duration was 244 minutes, compared to 192 minutes in 2013 and a target of 128 minutes per delivery point.

The significant outages which occurred on January 4 and 5, originating on the Avalon Peninsula, contributed 120 minutes per delivery point to the forced outage T-SAIDI for 2014 (approximately 56% of the total forced T-SAIDI). The increase in the T-SAIDI for planned outages was the result of increased maintenance on terminal station equipment.



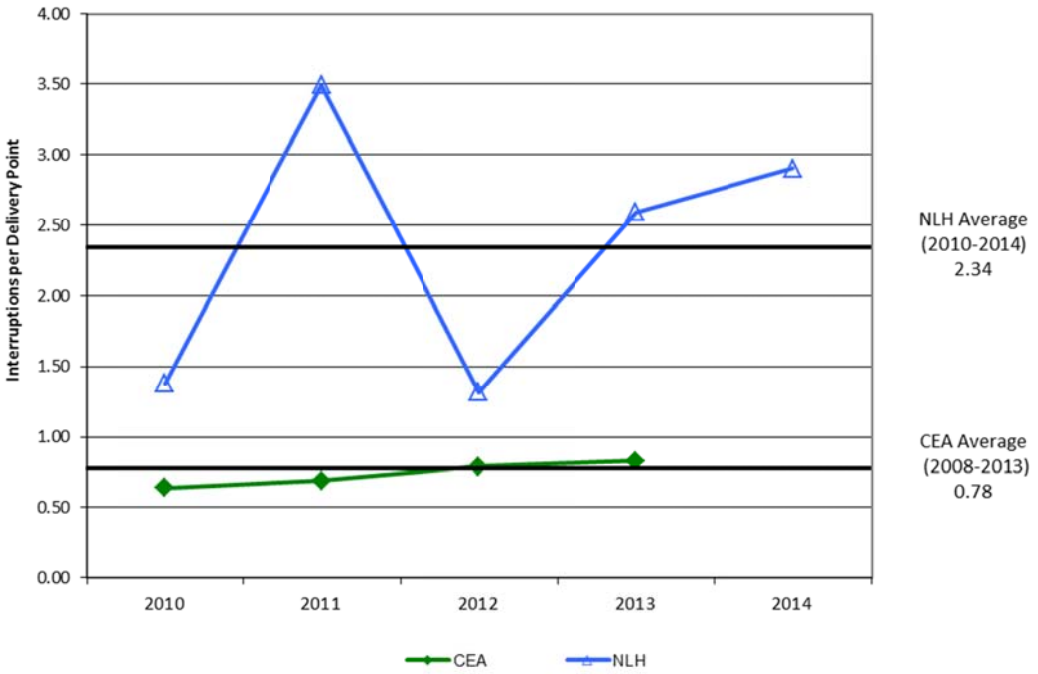



**3.1.2 b) Transmission System Average Interruption Frequency Index (T-SAIFI)** - *a reliability KPI for bulk transmission assets that measures the average number of sustained outages per delivery point*.

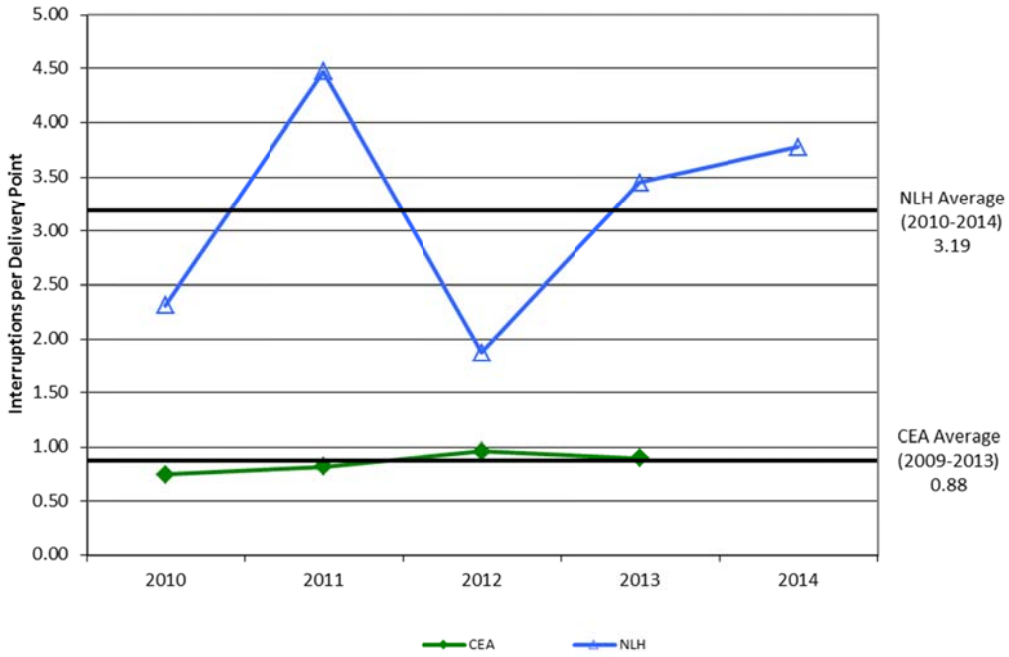
The fourth quarter T-SAIFI was 0.48 outages per bulk delivery point, with contributions of forced and planned outage frequency of 0.17 and 0.31, respectively. The 2013 fourth quarter T-SAIFI was 0.91 outages per bulk delivery point.

The 2014 T-SAIFI was 3.78 outages per bulk delivery point, compared to 2013 T-SAIFI of 3.45 outages per delivery point and the 2014 target of 1.58. The number of forced outages per delivery point in 2014 was 2.90 compared to 2.59 in 2013. The number of planned outages per delivery point in 2014 was 0.88 compared to 0.86 in 2013.

**Transmission - System Average Interruption Frequency Index (T-SAIFI)**
***FORCED OUTAGES ONLY***




**Transmission - System Average Interruption Frequency Index (T-SAIFI)**
***Forced & Planned Combined***

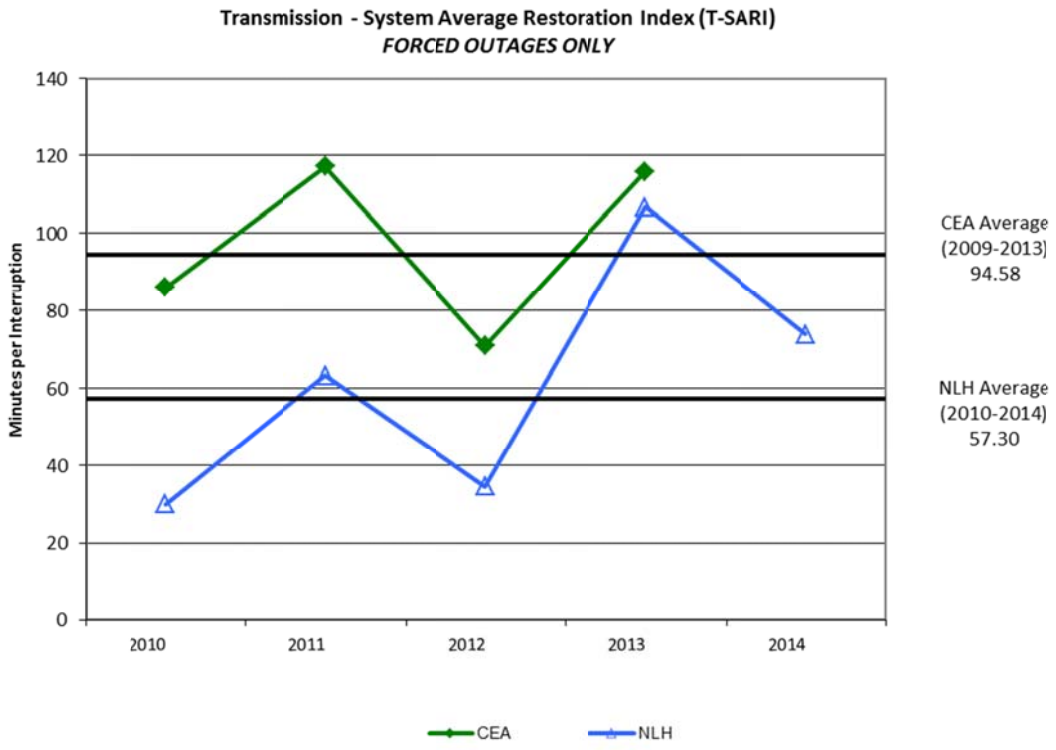


**3.1.2 c) Transmission System Average Restoration Index (T-SARI)** - *reliability KPI for bulk transmission assets which measures the average duration per transmission interruption. T-SARI is calculated by dividing T-SAIDI by T-SAIFI.*

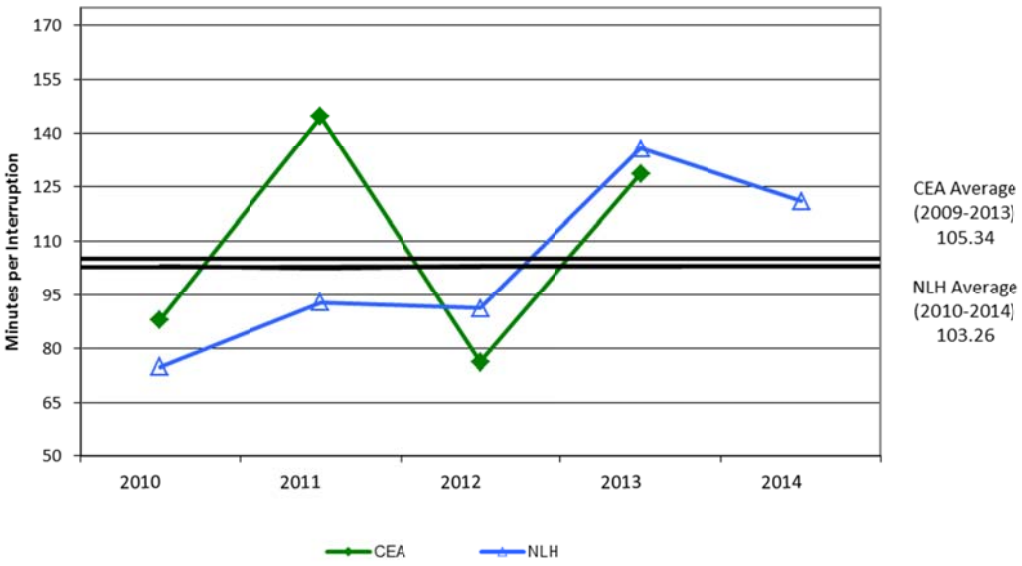
Hydro's total transmission T-SARI was 199 minutes per interruption for the fourth quarter of 2014, compared to 131 minutes per interruption during the same quarter in 2013. The forced outage component of T-SARI was 42 minutes per interruption, compared to 91 minutes per interruption in 2013. The planned outage component of T-SARI was 286 minutes per interruption compared to 192 minutes in 2013.

Hydro's 2014 total transmission T-SARI on an annual basis was 121 minutes per interruption, compared to 136 minutes in 2013 and a 2014 target of 114 minutes. The forced outage component of T-SARI was 74 minutes per interruption, compared to 107 minutes in 2013. The planned outage component of T-SARI was 277 minutes per interruption, compared to 223 minutes in 2013. Since T-SARI is the ratio of T-SAIDI to T-SAIFI, this increase results from the increase in T-SAIDI relative to T-SAIFI.

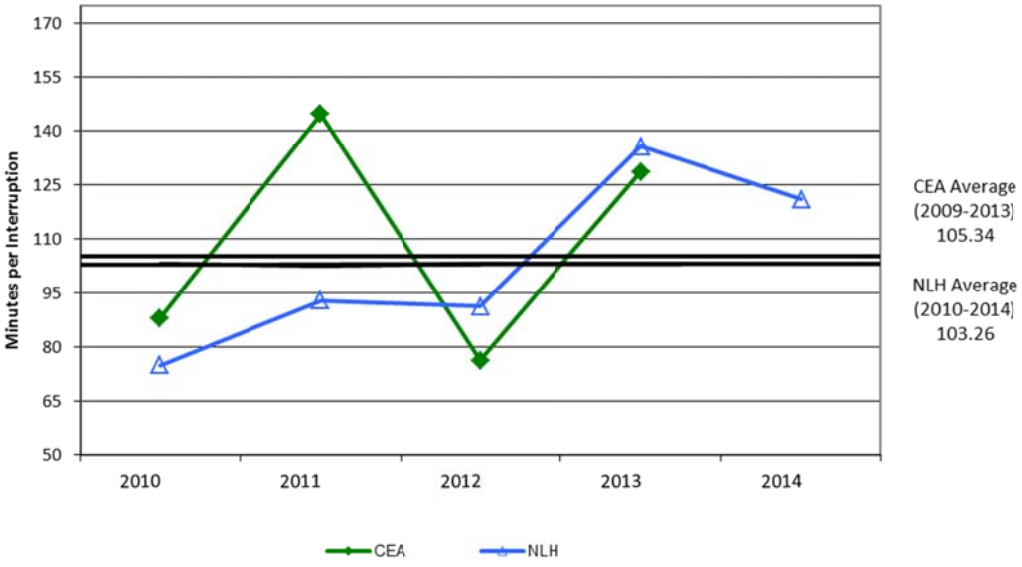
Hydro's total T-SARI performance improved in 2014 compared to 2013 and is better than the latest CEA five year average.



**Transmission - System Average Restoration Index (T-SARI)**
***Forced & Planned Combined***




**Transmission - System Average Restoration Index (T-SARI)**
***Forced & Planned Combined***




There were four forced transmission outages and 11 planned transmission outages in the fourth quarter. A summary of these outages follows:

**Forced**

On October 4, customers supplied by the Main Brook and Roddickton Terminal Stations experienced an unplanned power outage of ten minutes. The outage occurred at the commencement of a planned outage to perform preventative maintenance on breakers at the St. Anthony Airport Terminal Station. During the switching to prepare for the planned outage, there was a protection trip of TL261 on opening L56T1. Customers in St. Anthony continued to be supplied via the St. Anthony Diesel Plant.

On October 29, all customers on the Great Northern Peninsula, north of and including Plum Point, experienced an unplanned power outage of up to one hour and 32 minutes. The outages were caused by the misoperation of the neutral overcurrent protection on Plum Point transformer T1 resulting in a transformer lockout which tripped transmission Lines TL241 and TL244. The protection was activated by issues on feeder L2 in the Plum Point distribution area. Customers north of Plum Point were subjected to an extended outage due to the failure of a micro switch on the high side disconnect switch B1T1 on T1 at Plum Point. The failure of this micro switch required that personnel travel to Plum Point to reset the transformer lockout before TL241 and TL244 could be restored. The St. Anthony Diesel Plant was started to restore St. Anthony customers.

On November 9, customers supplied by the Main Brook and Roddickton Terminal Stations experienced an unplanned power outage of 25 minutes. The outage occurred during switching for a planned outage at the St. Anthony Airport Terminal Station. The customers in Main Brook, Roddickton and St. Anthony distribution systems were planned to be supplied by the St. Anthony diesel plant. The outage occurred when TL261 tripped when disconnect switch L56T1 was opened. The trip is related to an issue with the line distance protection on TL261 operating when the St. Anthony Airport Terminal Station is disconnected from the grid, while the St. Anthony Diesel Plant is on-line supplying customers in the St Anthony, Roddickton and Main Brook areas. A similar trip occurred on October 4. The problem with the line protection has been addressed to prevent further misoperations.

On December 17, customers supplied by the Hawke's Bay Terminal Station experienced an unplanned power outage of 16 minutes. The outage occurred after a fault occurred during the energization of the Mobile Substation P235 at Hawke's Bay during planned work. A set of temporary transportation grounds were not removed from P235 prior to its energization.

**Planned**

On October 4, customers supplied by the Bear Cove Terminal Station experienced a planned power outage of 13 minutes. The outage was required to isolate transmission line TL244 to perform preventative maintenance on breaker B1L44 at Plum Point Terminal Station.

On October 7, customers supplied by the Parson's Pond Terminal Station experienced a planned power outage of five hours and 16 minutes. The outage was required to perform preventative maintenance on equipment in the terminal station.

On October 18, customers supplied by the Wiltondale and Glenburnie Terminal Stations experienced a planned power outage of five hours. The outage was required to connect mobile substation P235 in Wiltondale in order to perform terminal station improvements.

On November 1, customers supplied by the Jackson's Arm and Hampden Terminal Stations experienced a planned power outage of six hours and 17 minutes. The outage was required to perform preventive maintenance on equipment in the terminal stations.

On November 2, customers supplied by the Jackson's Arm and Hampden Terminal Stations experienced a planned power outage of five hours and 36 minutes. The outage was required to complete preventive maintenance on equipment in the terminal stations.

On November 3, customers supplied by the Cow Head Terminal Station experienced a planned power outage of five hours and 36 minutes. The outage was required to remove the high voltage leads on circuit breaker B1L27 in the terminal station. Working is continuing to replace this breaker.

On November 5, customers supplied by the Rocky Harbour Terminal Station experienced a planned power outage of one hour and 11 minutes (71 minutes). The outage was required to obtain a dissolved gas analysis sample from transformer T1 in the station, in addition to the installation of a new pole on feeder L1 in the Rocky Harbour distribution system.

On November 13, customers supplied by the Cow Head and Parson's Pond Terminal Stations experienced a planned power outage of five minutes. The outage was required to safely close bypass switch B1L27-BP at Cow Head Terminal Station.

On November 16, all customers supplied by the Plum Point and Bear Cove Terminal Stations and customers supplied by feeder L2 in St. Anthony experienced a planned power outage of up to seven hours and 44 minutes. Customers in Main Brook, Roddickton, and St. Anthony feeders L1 and L3 were supplied via the St. Anthony Diesel Plant. The outages were required to perform preventative/corrective maintenance on circuit breaker B1L56, disconnect switch B1L44 and the BC6-R1 recloser structure at the Bear Cove station; and to perform preventative/corrective maintenance on circuit breaker B1L41, bypass switch B1L41-BP and disconnect switch B1T1 at the Plum Point station. In addition, the outage facilitated replacement of a pole on structure 405 on transmission line TL241.

On November 22, NP customers supplied by the Sunnyside Terminal Station experienced a planned power outage of five hours and 45 minutes. The outage was required to complete corrective and preventive maintenance on disconnect switches on bus B3 at the terminal station.

On December 2, customers supplied by the Wiltondale and Glenburnie Terminal Stations experienced a planned power outage of five hours and 51 minutes. The outage was required to disconnect the mobile substation P235 in Wiltondale and to energize the new Wiltondale Terminal Station.

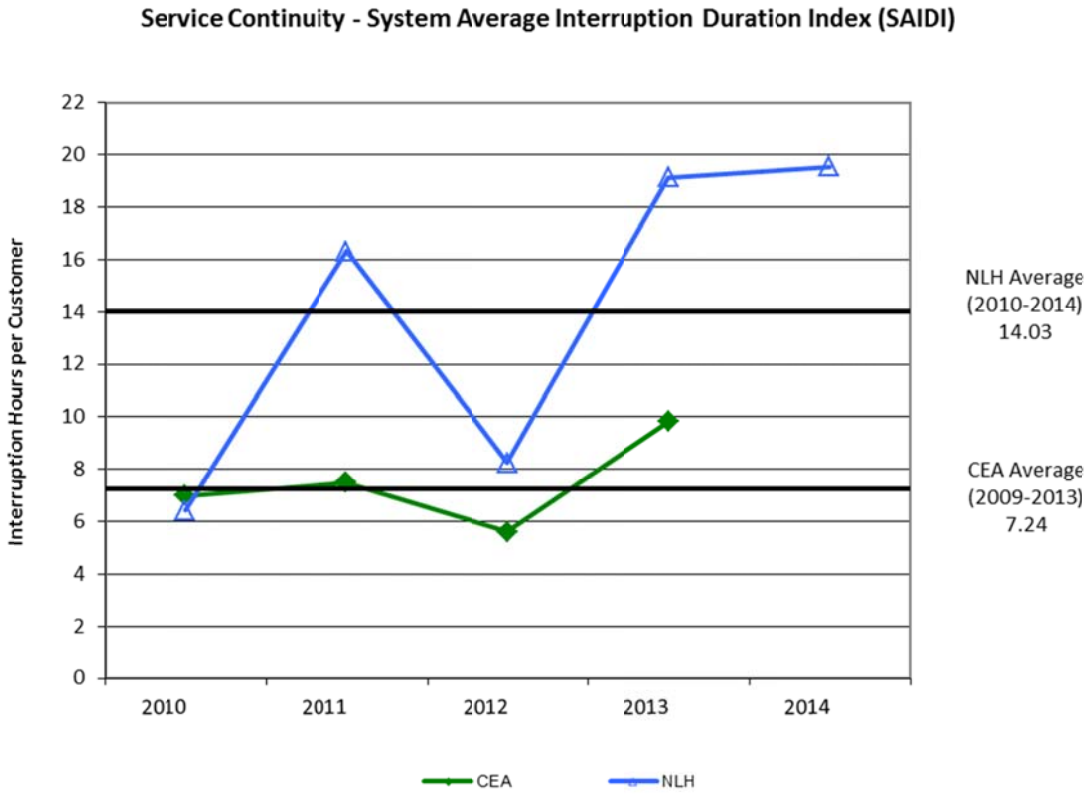
### *3.1.3 Reliability KPI: Distribution*

**3.1.3 a) System Average Interruption Duration Index (SAIDI)** - *a reliability KPI for distribution service and it measures service continuity in terms of the average cumulative duration of outages per customer served during the year.*

In the fourth quarter of 2014, SAIDI was 2.56 hours per customer, compared to 5.01 hours per customer during the same quarter of 2013.

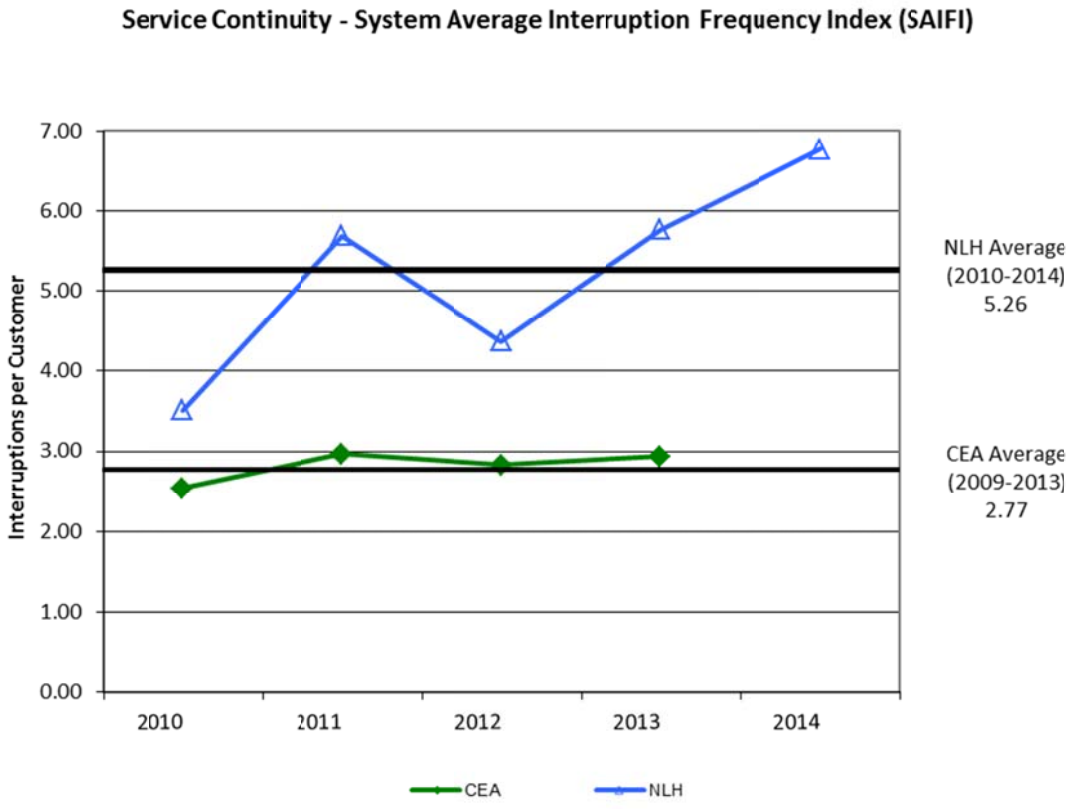
The total 2014 SAIDI was 19.56 hours per customer, compared to 19.22 hours per customer in 2013.

One of the main contributors to SAIDI was a series of planned outages in Labrador City and Wabush in the summer and fall of 2014. The planned outages in Labrador City were required to complete the voltage conversion project, while the Wabush planned outages were to complete upgrades at the Wabush Substation and for various distribution feeders.




**3.1.3 b) System Average Interruption Frequency Index (SAIFI)** - *reliability KPI for distribution service which measures the average cumulative number of sustained interruptions per customer per year.*

In the fourth quarter of 2014 SAIFI was 1.18, compared to 1.41 during the same quarter of 2013. The total 2014 SAIFI was 6.77, compared to 5.82 in 2013 and a target of 3.65 in 2014.




The outages during the fourth quarter resulted from a variety of causes. The following table presents a summary of the major interruptions.

| Distribution System | Outage Date | Outage Cause | Customers Affected | Outage Duration (Hours) | Notes |
|---|---|---|---|---|---|
| Labrador City | Oct 04, 2014 | Sched Outage-Planned | 593 | 4.00 | Planned outage to safely perform voltage conversion upgrades |
| Labrador City | Oct 19, 2014 | Sched Outage-Planned | 207 | 4.00 | Planned outage to safely perform voltage conversion upgrades |
| L'Anse-Au-Loup | Oct 25, 2014 | Adverse Weather | 984 | 7.47 | High Winds/Line damaged and required repairs |
| Ramea | Oct 31, 2014 | Adverse Weather | 330 | 4.77 | Phase wired burnt off and had to be re-attached |
| Rigolet | Nov 08, 2014 | Loss of Supply | 172 | 50.00 | Problems with diesel generator. Power rotation |
| Black Tickle | Nov 19, 2014 | Defective Equipment | 33 | 22.25 | Broken Conductor on feeder. Outage extended to due weather delay in getting extra crews on site. |
| Black Tickle | Dec 25, 2014 | Loss of Supply | 102 | 24.22 | Severe icing on feeder caused problems on diesel plant. Outage extended to due weather delays In getting extra crews on site. |

A summary of the more significant 2014 interruptions affecting the distribution systems (i.e., outages generally to a complete system with duration of greater than five hours) are contained in Appendix C2.

### 3.1.3 c) Additional Information

As per Hydro's regular quarterly report, this section provides more detailed information on distribution system interruptions with performance broken down by Area, Origin, and Type.

**Rural Systems Service Continuity Performance by Area**

| SAIFI (Number per Period) | | | | | |
|---|---|---|---|---|---|
| **Area** | **Fourth Quarter** | | **12 Mths to Date** | | **5 Year** |
| | **2014** | **2013** | **2014** | **2013** | **Average** |
| **Central** | | | | | |
| Interconnected | 0.27 | 0.71 | 2.48 | 4.02 | 2.78 |
| Isolated | 1.04 | 0.01 | 3.63 | 2.85 | 3.54 |
| **Northern** | | | | | |
| Interconnected | 1.19 | 1.91 | 7.26 | 4.90 | 5.22 |
| Isolated | 3.89 | 1.45 | 13.74 | 4.81 | 7.97 |
| **Labrador** | | | | | |
| Interconnected | 1.01 | 1.75 | 9.76 | 8.74 | 7.22 |
| Isolated | 6.10 | 2.24 | 10.88 | 9.04 | 10.02 |
| Total | 1.18 | 1.41 | 6.77 | 5.82 | 5.26 |

Note: System Average Interruption Frequency Index (SAIFI) is the average number of interruptions per customer. It is calculated by dividing the number of customers that have experienced an outage by the total number of customers in an area

| SAIDI (Hours per Period) | | | | | |
|---|---|---|---|---|---|
| **Area** | **Fourth Quarter** | | **12 Mths to Date** | | **5 Year** |
| | **2014** | **2013** | **2014** | **2013** | **Average** |
| **Central** | | | | | |
| Interconnected | 0.64 | 7.46 | 9.18 | 21.37 | 11.90 |
| Isolated | 1.88 | 0.05 | 4.56 | 2.55 | 3.30 |
| **Northern** | | | | | |
| Interconnected | 3.03 | 6.18 | 22.87 | 12.13 | 14.80 |
| Isolated | 10.15 | 0.94 | 43.60 | 6.07 | 13.87 |
| **Labrador** | | | | | |
| Interconnected | 1.72 | 2.67 | 26.48 | 28.56 | 16.79 |
| Isolated | 11.75 | 1.40 | 14.70 | 8.22 | 13.14 |
| Total | 2.56 | 5.01 | 19.56 | 19.22 | 14.03 |

Note: System Average Interruption Duration Index (SAIDI) is the average interruption duration per customer. It is calculated by dividing the number of customer-outage-hours (e.g. a two-hour outage affecting 50 customers equals 100 customer-outage-hours) by the total number of customers in an area.

## Rural Systems Service Continuity Performance by Origin

| SAIFI (Number per Period) | | | | | |
|---|---|---|---|---|---|
| **Area** | **Fourth Quarter** | | **12 Mths to Date** | | **5 Year** |
| | **2014** | **2013** | **2014** | **2013** | **Average** |
| Loss of Supply – Transmission | 0.01 | 0.27 | 2.34 | 1.32 | 1.67 |
| Loss of Supply – NF Power | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 |
| Loss of Supply – Isolated | 0.19 | 0.11 | 0.46 | 0.48 | 0.50 |
| Loss of Supply – L'Anse au Loup | 0.03 | 0.00 | 0.24 | 0.05 | 0.09 |
| Distribution | 0.96 | 1.02 | 3.73 | 3.95 | 2.99 |
| Total | 1.18 | 1.41 | 6.77 | 5.82 | 5.26 |

Note: System Average Interruption Frequency Index (SAIFI) is the average number of interruptions per customer. It is calculated by dividing the number of customers that have experienced an outage by the total number of customers.

| SAIDI (Hours per Period) | | | | | |
|---|---|---|---|---|---|
| **Area** | **Fourth Quarter** | | **12 Mths to Date** | | **5 Year** |
| | **2014** | **2013** | **2014** | **2013** | **Average** |
| Loss of Supply – Transmission | 0.04 | 0.56 | 4.22 | 4.36 | 3.51 |
| Loss of Supply – NF Power | 0.00 | 0.04 | 0.00 | 0.05 | 0.14 |
| Loss of Supply – Isolated | 0.15 | 0.04 | 0.26 | 0.21 | 0.23 |
| Loss of Supply – L'Anse au Loup | 0.01 | 0.00 | 0.20 | 0.05 | 0.07 |
| Distribution | 2.36 | 4.37 | 14.88 | 14.55 | 10.02 |
| Total | 2.56 | 5.01 | 19.56 | 19.22 | 14.03 |

Note: System Average Interruption Duration Index (SAIDI) is the average interruption duration per customer. It is calculated by dividing the number of customer-outage-hours (e.g. a two-hour outage affecting 50 customers equals 100 customer-outage-hours) by the total number of customers in an area.

## Rural Systems Service Continuity Performance by Type – 2014 Fourth Quarter Only

| Area | Scheduled | | Unscheduled | | Total | |
|---|---|---|---|---|---|---|
| | SAIFI | SAIDI | SAIFI | SAIDI | SAIFI | SAIDI |
| **Central** | | | | | | |
| Interconnected | 0.00 | 0.00 | 0.27 | 0.64 | 0.27 | 0.64 |
| Isolated | 0.16 | 0.04 | 0.88 | 1.84 | 1.04 | 1.88 |
| **Northern** | | | | | | |
| Interconnected | 0.54 | 1.38 | 0.65 | 1.65 | 1.19 | 3.03 |
| Isolated | 0.89 | 6.51 | 3.00 | 3.64 | 3.89 | 10.15 |
| **Labrador** | | | | | | |
| Interconnected | 0.61 | 1.44 | 0.40 | 0.29 | 1.01 | 1.72 |
| Isolated | 2.35 | 7.10 | 3.74 | 4.66 | 6.10 | 11.76 |
| Total | 0.47 | 1.41 | 0.71 | 1.15 | 1.18 | 2.56 |

Note:

1. System Average Interruption Frequency Index (SAIFI) is the average number of interruptions per customer. It is calculated by dividing the number of customers that have experienced an outage by the total number of customers in an area.
2. System Average Interruption Duration Index (SAIDI) is the average interruption duration per customer. It is calculated by dividing the number of customer-outage-hours (e.g. a two-hour outage affecting 50 customers equals 100 customer-outage-hours) by the total number of customers in an area.

### *3.1.4 Reliability KPI: Other*

**3.1.4 a) Under Frequency Load Shedding (UFLS)** - *reliability KPI that measures the number of events in which shedding of a customer load is required to counteract a generator trip. Customer loads are shed automatically depending upon the generation lost.*

There were four underfrequency events during the fourth quarter of 2014, summarized as follows:

- On October 13, Holyrood Unit 2 tripped. Hydro's investigation has concluded that the Holyrood Terminal Station (HRD TS) Unit #2 unit breakers (B2L42 & B2B11) tripped forcing Unit 2 offline. Hydro was conducting commissioning testing on the HRD TS Unit #1 unit breakers (B1L17 & B1B11) when the incident occurred. As part of the commissioning testing, a protection relay trip check was being performed on the Unit 1 unit breakers. The incorrect protection relay, the protection relay associated with Unit 2 unit breakers, was triggered. The incident and commissioning procedures have been reviewed to ensure a repeat of similar incidents is prevented.

  With the removal of generation (approximately 70 MW) the system frequency dropped to 58.66 Hz resulting in the activation of the under frequency protection at Newfoundland Power. Total system load at the time of the incident was 730 MW. All Newfoundland Power customers were reported to be restored within four minutes after the event occurred. Load Shed: Newfoundland Power: 16 MW. (Unsupplied Energy: 65 MW-Mins)

- On November 15, at 1621 hours, Holyrood Unit 2 tripped. Hydro's investigation has determined that part of the commissioning activities ongoing on Holyrood Unit 1 included control valve programming and testing. Completing this work required working on the Mark V Distributed Control System (DCS) which is common to both Units 1 and 2. Comparisons between Unit 1 and Unit 2 control valve programming were being checked when a test was initiated to stroke the valve on Unit 1. This test was accidentally initiated on Unit 2 causing the trip. The Unit 1 and Unit 2 distributed control system programming parameters are not distinguishable from each other at the programming level. The technologists mistakenly thought they were testing the Unit #1 parameters. Both the Hydro and the OEM contractor technologists are very familiar with this control system. Hydro has identified a failure to check/identify the task as the root cause. The outcomes of the investigation were reviewed with employees who may work inside the DCS to highlight the system limitations on naming convention.

  With the removal of generation (approximately 70 MW) the system frequency dropped to 58.68 Hz resulting in the activation of the under frequency protection at Newfoundland Power. Total system load at the time of the incident was 964 MW. All Newfoundland Power customers were reported to be restored within 2 minutes after the event occurred. Newfoundland Power load loss: 15 MW (Unsupplied Energy: 30 MW-Mins)

- On December 19, at 0849 hours, Holyrood Unit 2 tripped. Hydro's investigation determined the trip was the result of loss of power to all eight of the unit's 4160V motors. The motors tripped due to the failure of a motor lug resulting in a fault which was detected by the overcurrent protection. This subsequently tripped the unit.

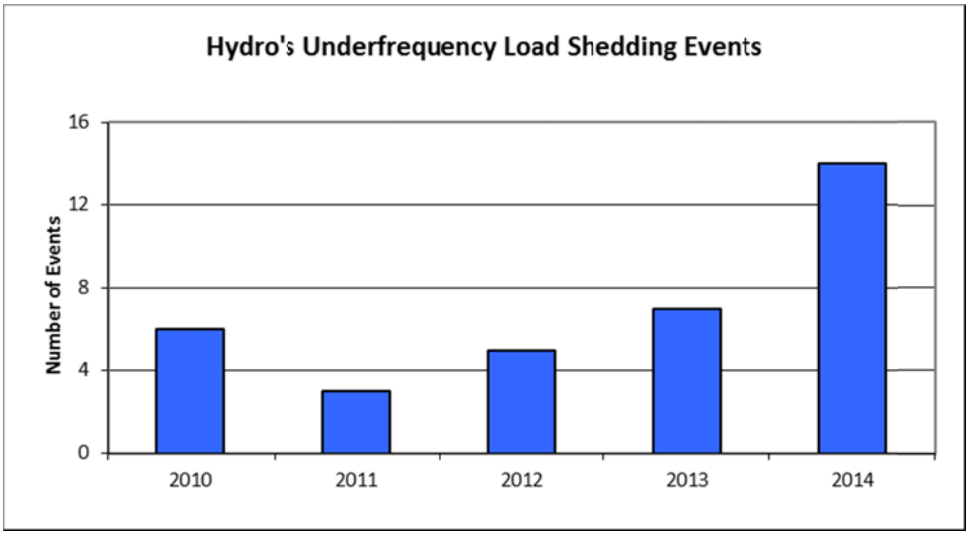
  With the removal of generation (approximately 72 MW) the system frequency dropped to 58.77 Hz resulting in the activation of the under frequency protection at Newfoundland Power. Total Island load at the time of the incident was 1125 MW. All Newfoundland Power customers were reported to be restored within 2 minutes after the event occurred. Newfoundland Power load loss: 23 MW (Unsupplied Energy: 46 MW-Mins)

- On December 30, at 2334 hours, Holyrood Unit 3 tripped. Hydro's investigation determined that the unit tripped because of a loss of atomizing steam going to the burner. Operations found two manual valves in the incorrect position (one 90% closed and one 100% closed). The unit controls operated correctly to adjust for a low aux steam pressure but the position of these valves resulted in the cut off of all atomizing steam.

  With the removal of generation (approximately 130 MW) the system frequency dropped to 58.36 Hz resulting in the activation of the under frequency protection at Newfoundland Power, Hydro, and Corner Brook Pulp & Paper Limited. Total Island load at the time of the incident was 1370 MW. Hydro advised Newfoundland Power to begin customer restoration within 4 minutes of the incident. Relative to the time of the incident: all (919) Hydro customers were restored within 4 minutes; Corner Brook Pulp & Paper Limited was restored within 5 minutes; the majority (15,683) of Newfoundland Power customers were reported to be restored within 22 minutes; and the remaining (1299) Newfoundland Power customers were reported to be restored within 69 minutes.

| | | |
|---|---|---|
| Load Shed: | Newfoundland Power: | 95 MW |
| | Hydro: | 3 MW |
| | Corner Brook Pulp & Paper: | 14 MW |
| | Total Load Shed: | 112 MW |
| | *(Unsupplied Energy: 1,664 MW-Mins)* | |

In total, there were 14 UFLS events in 2014, compared to 7 in 2013 and the five-year average (2009-2013) of 5.6 events. Refer to the graph below which compares the UFLS events over the past five years to this year's performance.




The following table compares the UFLS events in the fourth quarter of 2014 to the same quarter in 2013 in addition to annual performance.

**Underfrequency Load Shedding Number of Events**

| Customers | Fourth Quarter | | Year to Date | | 5 Year Average |
|---|---|---|---|---|---|
| | 2014 | 2013 | 2014 | 2013 | (2010–2014) |
| NF Power | 4 | 1 | 14 | 7 | 7 |
| Industrials | 1 | 0 | 3 | 0 | 1.2 |
| Hydro Rural* | 1 | 1 | 2 | 3 | 1.6 |
| Total Events | 4 | 1 | 14 | 7 | 7 |

**Underfrequency Load Shedding Unsupplied Energy (MW-min)**

| Customers | Fourth Quarter | | Year to Date | | 5 Year Average |
|---|---|---|---|---|---|
| | 2014 | 2013 | 2014 | 2013 | (2010–2014) |
| NF Power | 1,722 | 175 | 5,798 | 13,917 | 4,713 |
| Industrials | 70 | 0 | 200 | 0 | 92 |
| Hydro Rural* | 12 | 0 | 48 | 324 | 96 |
| Total Events | 1,804 | 175 | 6,046 | 14,241 | 4,901 |

* Underfrequency activity affecting Hydro Rural Customers may also result in a number of delivery point outages. Outage frequency and duration are also included in totals shown in the delivery point statistics section of the report for these areas, namely the Connaigre Peninsula and Bonne Bay.

The details of the previous 10 UFLS events in 2014 are summarized in Appendix C3.

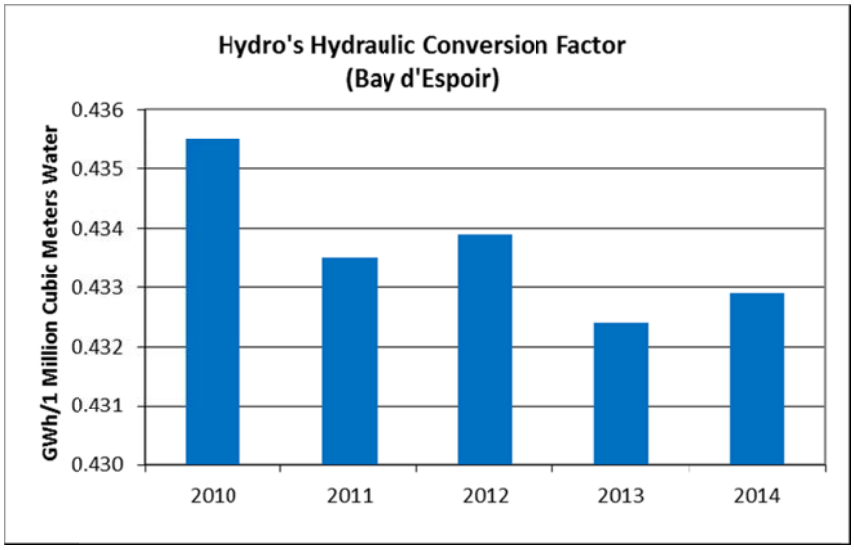
## *3.2 Operating Performance Indicators*

This section presents information on two indicators of operating performance, both of which are associated with generation.

### *3.2.1 Operating KPI: Generation*

**3.2.1 a) Hydraulic Conversion Factor (Bay d'Espoir)** - *a representative performance KPI for the principal hydroelectric generation assets located at Bay d'Espoir. This KPI tracks the efficiency in converting water to energy and it is calculated as the ratio of Net GWh generated for every one million cubic metres (MCM) of water consumed.*

In 2014, the hydraulic conversion factor for Bay d'Espoir was 0.4329 GWh/MCM, compared to 0.4324 GWh/MCM compared to a 2014 target of 0.433 GWh/MCM.




In 2014, the water levels were lower in the reservoirs allowing for improved water utilization at the Bay d'Espoir plant, as there were fewer hours where plant production was higher at less efficient output levels.

**3.2.1 b) Thermal Conversion Factor -** *a representative performance KPI for the oil-fired thermal generation assets located at Holyrood. This KPI tracks the efficiency in converting heavy fuel oil into electrical energy and is measured as the ratio of the net kWhs generated to the number of barrels of No. 6 fuel oil consumed.*

The thermal conversion factor for Holyrood is proportional to the output level of the three units, with higher averages and sustained loadings resulting in higher conversion factors. The output level of the Holyrood Thermal Generating Station will vary depending on hydraulic production on the Island, quantity of power purchases, customer energy requirements and system security requirements. The thermal conversion factor is also impacted by the heating content in the No. 6 fuel consumed at the plant, measured in BTUs/bbl.

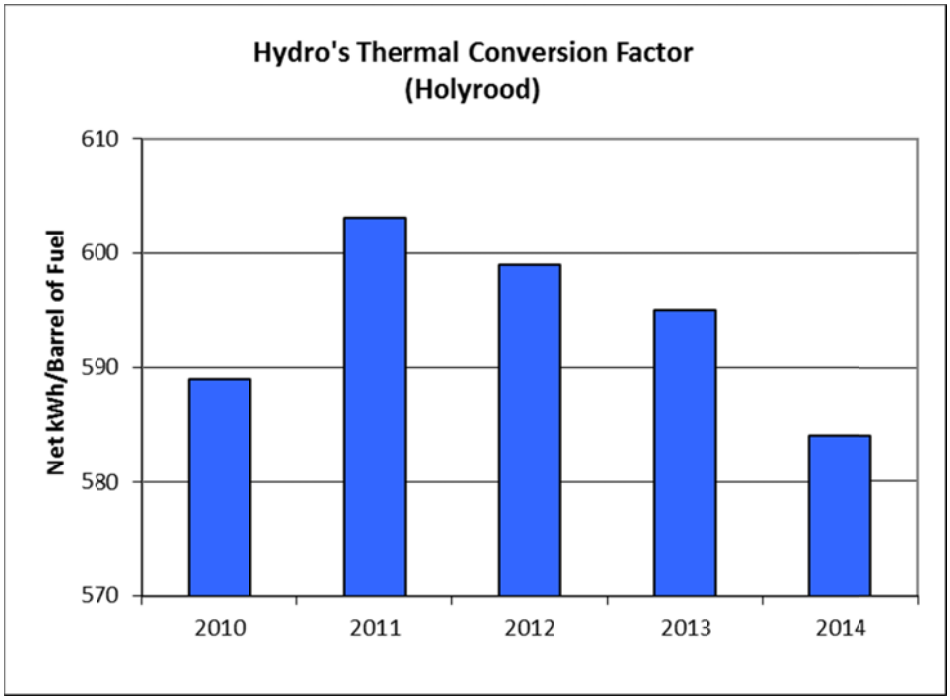
In 2014, Hydro's net thermal conversion factor was 584 kWh per barrel compared to a 2014 target of 615 kWh per barrel. The lower energy conversion rate in 2014, relative to the target, is resulting from two primary factors:

- operating the units at a lower average output level due to the high volume of water resources on the Island and energy receipts relative to the system load requirements; and
- a low heating content in the No. 6 fuel consumed at the Holyrood generating station.

The efficiency at the Holyrood plant has remained relatively consistent with a gross heat rate performance of 10,124 BTU/kWh in 2014 compared to 10,127 BTU/kWh in 2013.

In 2014, the units were dispatched as required for Avalon transmission support and system peak load considerations. The average net unit load while operating was 83.2 MW, down from 87.6 MW in 2013 and a forecast of 92.3 MW for 2014.

Overall, net production from Holyrood for 2014 was 1,315 GWh, a 37% increase from 2013 production levels and a decrease of 8% from the 2014 forecast. The production increase in 2014 relative to 2013 was related to operating one unit throughout the summer months in 2014 in order to support the transmission into the Avalon Peninsula, in addition to higher customer demand requirements during the winter and early spring period.


Hydro's Thermal Conversion Factor
(Holyrood)
Net kWh/Barrel of Fuel
610
600
590
580
570
2010
2011
2012
2013
2014

## *3.3 Financial Performance Indicators [complete section updated]*

The financial KPIs reported annually to the Board are:

1. Corporate operating, maintenance and administrative expense (OM&A) per MWh delivered;
2. Generation OM&A per MW installed capacity;
3. Generation OM&A per GWh generated;
4. Transmission OM&A per transmission circuit km; and
5. Distribution OM&A per distribution circuit km.[4]

In Order No. P.U. 8 (2007), the Board ordered that Hydro file a report no later than October 31, 2007 outlining an appropriate peer group with which Hydro's financial performance at the generation and transmission levels could be compared. In compliance with Board Order No. P.U. 8 (2007), Hydro filed a report titled "Peer Group Benchmarking" dated October 31, 2007 which summarized Hydro's findings regarding development of a peer group for financial KPIs related to generation and transmission. In that report, Hydro identified separate peer groups for generation KPIs and transmission KPIs and proposed that, subject to data availability, the selected peers remain constant to allow for meaningful trend comparisons over time. This is the seventh year of reporting generation and transmission financial KPI peer data. The list of peers used for KPI benchmarking for Financial Performance Indicators is included as Appendix D. This peer group benchmarking data is sourced from the U.S. Federal Energy Regulatory Commission (FERC) database, to which Hydro has a subscription. All financial data for the U.S.-based peer group is in $US and all financial data for Hydro is in $Cdn.

With respect to the Corporate and Distribution KPIs (items 1 and 5 above), in its 2007 Annual Report on KPIs Hydro had incorporated peer benchmarking data from the Canadian Electricity Association's (CEA) Committee on Performance Excellence (COPE) as published in the "Peer Group Performance Measures for Newfoundland Power" report. However, the CEA has informed Newfoundland Power that the composite information for these measures is no longer available, nor are any other cost-related CEA composite indicators available for benchmarking purposes.[5] As a result, Newfoundland Power is now using a peer group of U.S. companies. This group of US companies is not an appropriate group for Hydro due to Hydro's relatively small distribution component. In order to maintain consistency for year-over-year comparisons, Hydro is using the same peer group of U.S. companies for the Corporate Controllable Unit Cost KPI that Hydro uses for its generation financial benchmarking.

[4] This KPI is not available for benchmarking from 2007 onwards. It will continue to be reported for Hydro for annual comparison purposes. Please see section 3.3.4 a) Distribution Controllable Cost for a discussion of the alternate KPI to be used for peer benchmarking.
[5] "Peer Group Performance Measures for Newfoundland Power", December 23, 2008, p.2.

### 3.3.1 Financial KPI: Corporate

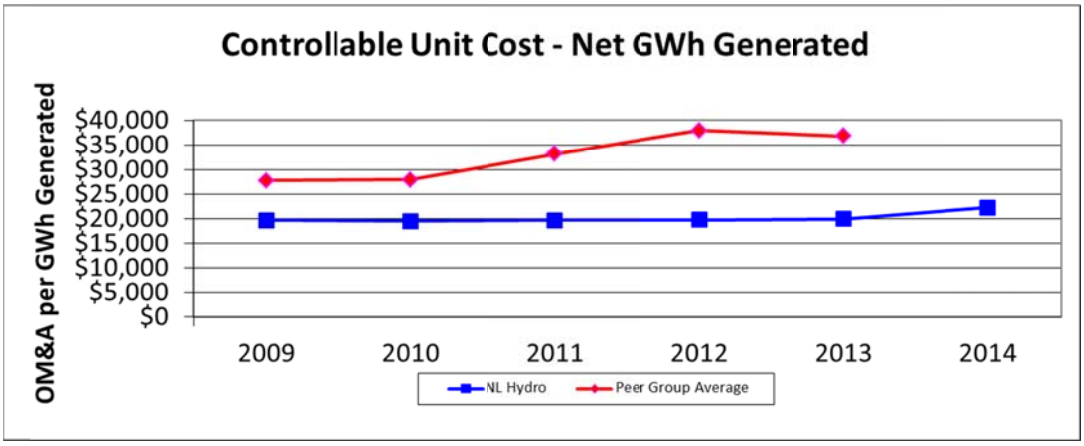
**3.3.1 a) Controllable Unit Cost** - *a high level corporate KPI that tracks Hydro's OM&A expenses in relation to its total energy delivered, expressed as dollars per MW hour. Total Corporate OM&A includes all operating labour and materials for Hydro's generation, transmission, distribution, customer-related and administrative costs, and loss on disposal of capital assets. Energy deliveries have been normalized for weather, customer hydrology, and industrial strikes.*

Hydro's OM&A costs increased from $113.8 million in 2013 to $134.2 million[6] in 2014, resulting in a Controllable Unit Cost of $18.09 per MWh delivered for 2014.

Up to 2006, Hydro's Controllable Unit Cost was compared to the average Controllable Unit Cost for participants in the CEA COPE program as reported by Newfoundland Power. As of 2008, however, Newfoundland Power no longer uses CEA COPE benchmarking data for cost-related measures, because the composite information for these measures is no longer available for publication. Peer group results for the period 2007-2013 have therefore been herein restated using the same U.S. Peer Group that Hydro uses for generation financial KPIs.

For computation of Hydro's Corporate Controllable Unit Cost, normalized energy delivered is used. However, the available peer group data from the FERC database is based on net energy generated. Thus, for better comparison against the peer group, Hydro's data will also be calculated and charted on this basis. Hydro's Corporate OM&A per unit of net generation was $22.26 per MWh during 2014, higher than the computed Controllable Unit Cost, because normalized deliveries are higher than net generation due to the effect of Hydro's energy purchases.

Hydro's Corporate Controllable Unit Cost is following a very steady trend as compared to an upward trend from 2009 to 2012 with a slight decline in 2013 for the peer group. However, it is difficult to determine specifically what factors might be impacting the expenses of the peer group participants without detailed information regarding their operations and finances.



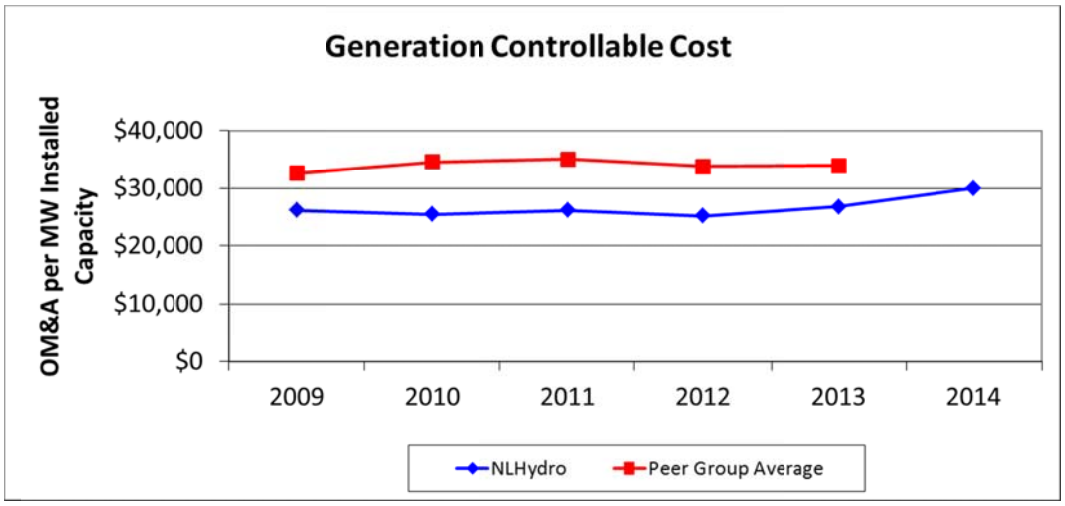

[6] This $ 134.2 million was calculated in the 2014 Cost of Service study and includes a $1.9 million cost to Hydro that was incurred to service an unregulated Industrial Customer. The $1.9 million was excluded when the $132.3 million regulated amount was reported on the Statement of Income – Regulated Operations for 2014, filed as part of the December 31, 2014 Quarterly Regulatory Report.

### 3.3.2 Financial KPI: Generation

**3.3.2 a) Generation Controllable Cost** - *a functional corporate KPI that tracks Hydro's generation costs in relation to its installed generation. It is computed by dividing generation OM&A by installed capacity as measured in MW.*

Generation Controllable Cost was $30,013 per MW for 2014 compared with $26,774 in 2013 an increase of $3,239 per MW. As mentioned in prior annual KPI reports, an asbestos abatement program was undertaken at Holyrood in 2005 through 2007. Amortization of costs associated with this program concluded during 2012.

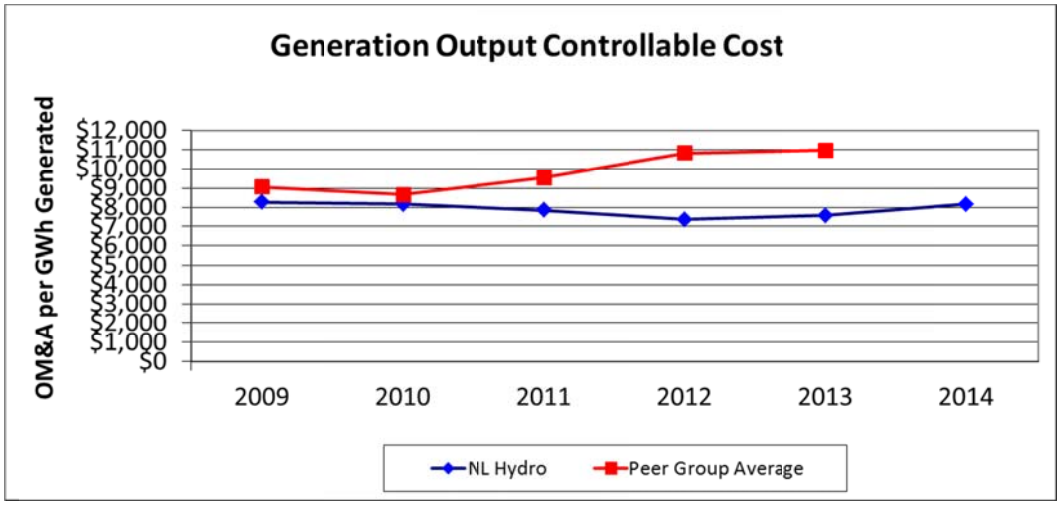
The peer group used to benchmark Generation Controllable Costs appears to be experiencing a steady trend in 2012 and 2013 OM&A per MW installed capacity while Hydro is showing increases in 2013 and 2014.




**3.3.2 b) Generation Output Controllable Cost** - *a functional corporate KPI that tracks Hydro's generation OM&A expenses in relation to its net generation measured in GWh.*

In 2014, Hydro's Generation Output Controllable Cost of $8,150 per GWh, was higher than the $7,568 in 2013. There was an increase in the Generation Costs component of approximately $6.0 million from 2013 to 2014 coupled with an increase of 336 GWh in the Net Energy Generated.

From 2009 through 2010, Hydro's Generation Output Controllable Costs were primarily in line with and trending in a similar direction as those of the peer group with moderate declines for Hydro in 2011 and 2012 and moderate increases recorded in 2013 and 2014.

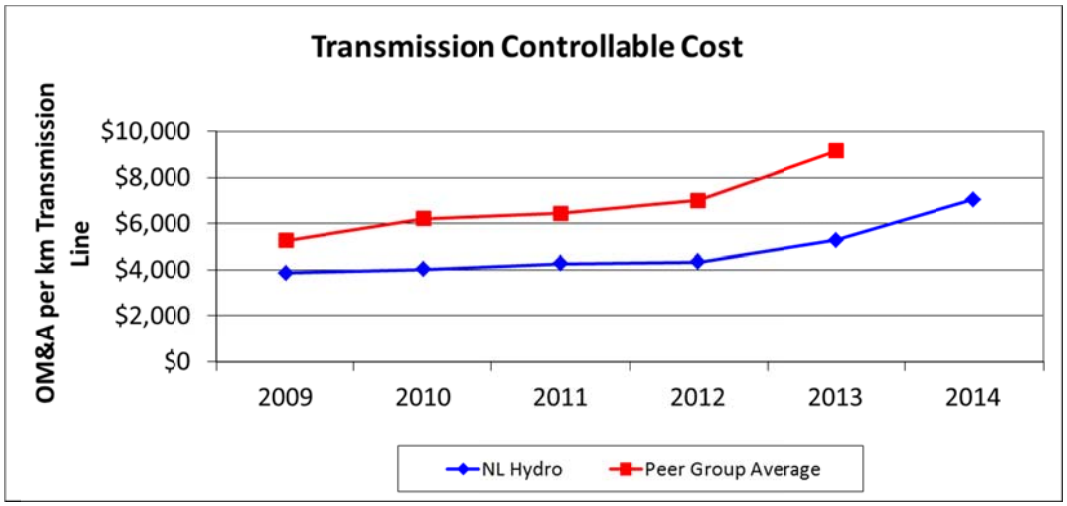



### 3.3.3 Financial KPI: Transmission

**3.3.3 a) Transmission Controllable Cost** - *a KPI that tracks Hydro's transmission OM&A expenses in relation to the 230 kV equivalent length of its transmission circuits (69 kV lines and above).*

In 2014, Hydro's Transmission Controllable Cost was $7,043 per km of transmission, an increase of 33.4% over 2013.

Hydro's costs per km of transmission circuit are trending in a similar pattern as the peer group, although per unit cost increases appear to be increasing at a slower rate within Hydro for the period 2010 to 2013. A direct cost per unit km within the peer group is not meaningful due to differences in accounting and corporate cost allocations; however comparisons over time can highlight relevant trends.



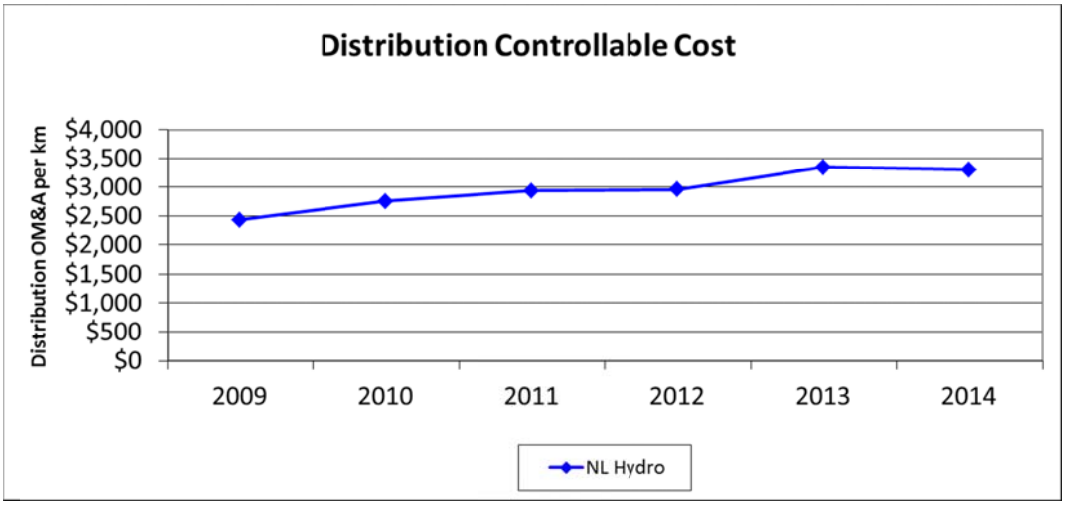
### 3.3.4 Financial KPI: Distribution

**3.3.4 a) Distribution Controllable Cost** - *a functional corporate KPI that tracks Hydro's distribution OM&A expenses in relation to the length of its equivalent 230 kV distribution circuits in kilometres*[7].

The Distribution Controllable Cost KPI had previously been reported as dollars per km of distribution using the CEA COPE data. As discussed, the CEA COPE data is no longer available for benchmarking of financial KPIs. Additionally, although distribution cost data is available for the U.S.-based peer group used by Hydro for Transmission Controllable Cost, the associated km of distribution data is unavailable. In the absence of the CEA COPE data, Newfoundland Power has chosen to use a KPI that divides total Distribution OM&A by MWh of retail sales. Hydro will therefore use this same data set. However, given Hydro's relatively small quantity of retail sales, combined with the rural and remote locations of these sales, it is expected that Hydro's Distribution cost per MWh will be significantly higher than Newfoundland Power's and the peer group average.

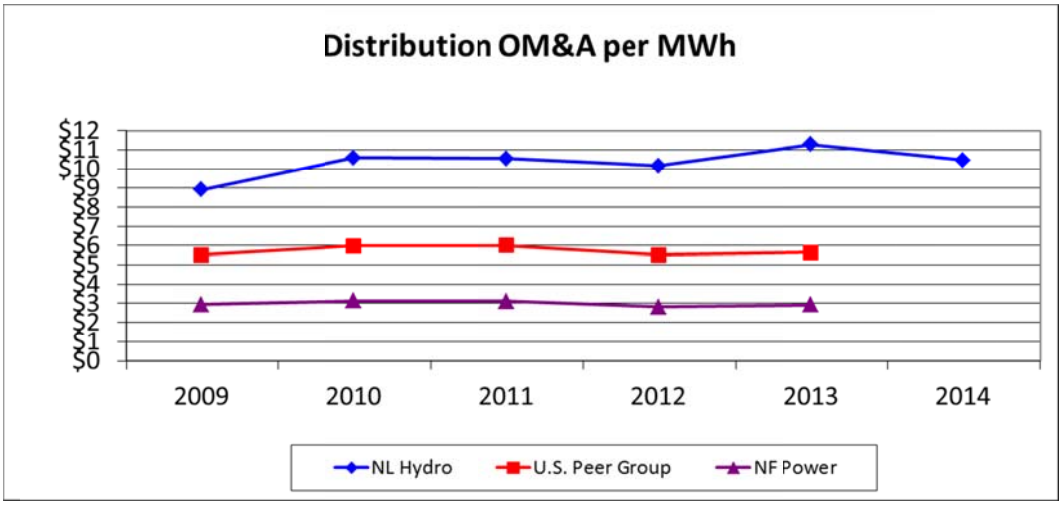
The distribution cost per km of circuit length will continue to be reported for year-over-year trend analysis.

At $3,304 per circuit km Hydro's Distribution Controllable Cost of 2014 decreased from the $3,345 that was recorded in 2013. This is a slight downward trend in this cost in 2014 compared to the increase trend that was seen between 2009 and 2013.




As expected, Hydro's distribution costs of $11.27 in 2013 trend higher than those of its peers in the table below. The distribution systems are a relatively small component of Hydro's total plant compared to generation and transmission plant and also compared to Newfoundland Power's distribution assets. Thus, Hydro's higher costs per MWh are likely due to the rural and geographically dispersed nature of its distribution systems and the resultant inability to achieve cost economies.

[7] CEA COPE peer data used up to 2007 excluded circuits less than 1 kV. Hydro's data has also been adjusted to exclude circuits less than 1 kV from 2003 onward.




## *3.4 Customer-Related Performance Indicators*

**3.4.1 a) Residential Customer Satisfaction** - *an indicator of Hydro's residential customers overall satisfaction level with service, which is tracked by the Percent Satisfied Customers KPI*[8]*.*

*The Percent Satisfied Customers measure is also a corporate performance KPI that tracks the satisfaction of rural residential customers with Hydro's performance. The Percent Satisfied Customers measure is produced via an annual survey of Hydro's residential customers.*

The 2014 residential customer satisfaction survey shows that 84% of customers are either very satisfied or somewhat satisfied with Hydro.

[8] As of 2009, the Customer Satisfaction index (CSI) is no longer being calculated as a Customer-Related Performance Indicator.

Redidential Customer Satisfaction
Overall Customer Satisfaction
94
92
90
88
86
84
82
80
78
76
74
2008
2009
2010
2011
2012
2014

# *Appendices*

# Appendix A: Rationale for Hydro's 2014 KPI Targets

| KPI | Comment on KPI 2014 Target |
|---|---|
| Reliability | Hydro has adopted a target setting approach wherein known factors that affect reliability performance are incorporated into the target setting process wherever practical. This approach also uses percentage improvements and past performance levels to set target levels for continuous improvements. |
| Weighted Capability Factor | The 2014 target is set using the expected annual generation unit outage schedule combined with performance improvements relative to recent history. |
| Weighted DAFOR | The 2014 target is set using the expected annual generation unit outage schedule combined with performance improvements relative to recent history. |
| Transmission SAIDI, SAIFI, and SARI | The 2014 targets for forced outage performance are set based upon recent performance improvements. The planned outage contribution to total performance is set using the annual transmission terminals maintenance outage plan. |
| Distribution SAIDI & SAIFI | Improvements relative to the most recent five-year average. |
| Underfrequency Load Shedding | The 2014 target is based upon improvement over the most recent five-year average. |
| **Operating** | |
| Hydraulic Conversion Factor | Hold at the previous target value. |
| Thermal Conversion Factor | The 2014 target is based on November 2013 budget for 2014 Holyrood plant operation. |
| **Other** | |
| Customer Satisfaction | Targeting continuous improvement. |

# Appendix B: Computation of Weighted Capability Factor and Factors Impacting Performance

Weighted Capability Factor is calculated using the following formula:

$$1 - \frac{\sum_{all\ units}\left(\frac{unit\ total\ equivalent\ outage\ time \times unit\ MCR}{unit\ hours}\right)}{\sum_{all\ units} unit\ MCR}$$

Where,

**MCR** = Maximum Continuous Rating, the gross maximum electrical output, measured in megawatts, for which a generating unit has been designed and/or has been shown capable of producing continuously. MCR would only change if the generating capability of a unit is permanently altered by virtue of equipment age, regulation, or capital modifications. Such changes to MCR are infrequent and have not actually taken place within Hydro since the 1980's when two units at Holyrood were uprated due to modifications made to these units.

**Unit hours** = the sum of hours that a unit is in commercial service. This measure includes time that a unit is operating, shut down, on maintenance, or operating under some form of derating. Unit hours will only be altered in the infrequent event that a unit is removed from commercial service for an extended period of time.

**Unit total equivalent outage time** = the period of time a unit is wholly or partially unavailable to generate at its MCR. For the purposes of calculating outage time, the degree to which a unit is derated is converted to an outage equivalency. Thus, a unit that is able to generate at 75% load for four days would have an equivalent outage time of one full day out of four. Factors that can affect unit total equivalent outage time are classified by CEA under nine categories, which are outlined in Appendix A to this Report. Hydro tracks the time that each unit spends in each of these nine states and calculates the weighted capability accordingly.

Unit total equivalent outage time is the measure that is most likely to impact Weighted Capability Factor on a year-to-year basis, since MCR and unit hours are unlikely to change.

# Appendix B: Computation of Weighted Capability Factor and Factors Impacting Performance (Cont'd)

**Factors that Affect Unit Total Equivalent Outage Time**

1. **Sudden Forced Outage.** An occurrence wherein a unit trips or becomes immediately unavailable.
2. **Immediately Deferrable Forced Outage**. An occurrence wherein a unit must be made unavailable within a very short time (10 minutes).
3. **Deferrable Forced Outage**. An occurrence or condition wherein a unit must be made unavailable within the next week.
4. **Starting Failure**. A condition wherein a unit is unable to start.
5. **Planned Outage**. A condition where a unit is unavailable because it is on its annual inspection and maintenance.
6. **Maintenance Outage**. A condition where a unit is unavailable due to repair work. Maintenance outage time covers outages that can be deferred longer than a week, but cannot wait until the next annual planned maintenance period.
7. **Forced Derating**. A condition that limits the usable capacity of a unit to something less than MCR. The derating is forced in nature, typically because of the breakdown of a subsystem on the unit.
8. **Scheduled Derating**. A condition that limits the usable capacity of a unit to something less than MCR, but is done by virtue of the decision of the unit operator. Scheduled deratings are less common than forced deratings, but can arise, for example, when a unit at Holyrood is derated to remove a pump from service.
9. **Common Mode Outages**. Common mode outages are rare, and arise when an event causes multiple units to become unavailable. An example might be the operation of multiple circuit breakers in a switchyard at Holyrood due to a lightning strike, rendering up to three units unavailable.

Note: There are hundreds of CEA equipment codes for generator subsystems that track the cause for the time spent in each of the above categories.

# Appendix C1: Significant Transmission Events – 2014

There were 12 significant events in 2014. The details follow:

## Event 1

On January 4 at 0905 hours, transformer T1 at the Sunnyside Terminal Station faulted resulting in a fire. Circuit breaker B1L03 failed to isolate T1, and resulted in a trip of transmission lines TL203 and TL237, isolating the Avalon Peninsula from the remainder of the power system. This resulted in the interruption of the following generation: Holyrood Plant, Cat Arm Plant, Hinds Lake Plant, Granite Canal Plant, Upper Salmon Plant, Stephenville Gas Turbine, St. Anthony Diesel Plant, and Hawke's Bay Diesel Plant. **(Unsupplied Energy: 158,954 MW-Mins)**

The following table outlines the delivery point customer interruptions.

| Events on January 4, 2014 (09:05 hrs) | | | | | |
|---|---|---|---|---|---|
| **Delivery Point Affected** | **Start Time** | **Finish Time** | **Duration of Interruptions (mins)** | **MW Load** | **MW-Mins** |
| | | | | | |
| Hardwoods | 1/4/2014 9:05 | 1/4/2014 9:52 | 47 | 268 | 12,596 |
| Oxen Pond | 1/4/2014 9:05 | 1/4/2014 10:43 | 98 | 286 | 28,067 |
| Holyrood - 39L | 1/4/2014 9:05 | 1/4/2014 14:01 | 296 | 29 | 9,320 |
| Holyrood - 38L | 1/4/2014 9:05 | 1/4/2014 14:07 | 302 | 46 | 13,771 |
| Western Avalon - 64L | 1/4/2014 9:05 | 1/4/2014 14:44 | 339 | 94 | 27,735 |
| Western Avalon - Bus B2 | 1/4/2014 9:05 | 1/4/2014 14:01 | 296 | 46 | 16,780 |
| Vale (Long Harbour) | 1/4/2014 9:05 | 1/4/2014 12:22 | 197 | 6 | 1,143 |
| Sunnyside - rural (T5) | 1/4/2014 9:05 | 1/4/2014 20:07 | 662 | 9 | 6,091 |
| Sunnyside - TL219 | 1/4/2014 9:05 | 1/4/2014 20:07 | 662 | 29 | 20,445 |
| Linton Lake | 1/4/2014 9:05 | 1/4/2014 20:07 | 662 | 17 | 11,985 |
| Bay L'Argent | 1/4/2014 9:05 | 1/4/2014 20:07 | 662 | 17 | 4,653 |
| Monkstown | 1/4/2014 9:05 | 1/4/2014 20:07 | 662 | 17 | 2,397 |
| Duck Pond Mine | 1/4/2014 9:05 | 1/4/2014 12:46 | 221 | 9 | 1,923 |
| Wiltondale | 1/4/2014 9:05 | 1/4/2014 9:33 | 28 | 0.1 | 4 |
| Glenburine | 1/4/2014 9:05 | 1/4/2014 9:33 | 28 | 3 | 78 |
| Rocky Harbour | 1/4/2014 9:05 | 1/4/2014 9:33 | 28 | 4 | 118 |
| Grandy Brook | 1/4/2014 9:05 | 1/4/2014 9:33 | 28 | 5 | 132 |
| St Alban's | 1/4/2014 9:05 | 1/4/2014 10:19 | 74 | 5 | 548 |
| Conne River | 1/4/2014 9:05 | 1/4/2014 10:37 | 92 | 2 | 187 |
| English Harbour West | 1/4/2014 9:05 | 1/4/2014 10:37 | 92 | 4 | 362 |
| Barachoix | 1/4/2014 9:05 | 1/4/2014 10:37 | 92 | 7 | 619 |
| | | | | | |
| Come By Chance T2 | 1/4/2014 9:05 | 1/4/2014 13:18 | N/A (BES: 253 mins) | N/A | N/A |
| | | | | | |
| | | **Totals** | | | 158,954 |

## Appendix C1: Significant Transmission Events – 2014 (Cont'd)

## Event 2

On January 4 at 1533 hours, personnel were in the process of re-energizing SSD T4. The transformer had tripped after transformer T1 locked out earlier in the day. During the re-energization there was a breaker failure protection operation associated with the transformer breaker B3T4. Circuit breaker B1L02 at the Sunnyside Terminal Station failed to open due to the breaker failure protection configuration, and resulted in the trip of transmission line TL206 at the Bay d'Espoir Generating Plant. The distance protection was activated on transmission line TL202 but failed to trip this line at the Bay d'Espoir Generating Plant, resulting in a bus lockout on BDE Bus B3 and the loss of the Bay d'Espoir Units 5 and 6. Circuit breaker B5B6 falsely tripped at Bay d'Espoir resulting in the loss of transmission line TL204. Transmission lines TL202, TL203, TL206 and TL207 tripped at the Sunnyside Terminal Station, resulting in the isolation of the Avalon Peninsula from the remainder of the power system. The Come by Chance Oil Refinery was also interrupted. This disturbance resulted in the interruption of the following generation: Cat Arm Plant, Granite Canal Plant, Stephenville Gas Turbine, and Hawke's Bay Diesel Plant. The Holyrood units had not been restored following the events earlier in the morning.
(**Unsupplied Energy: 13,836 MW-Mins)**

The following table outlines the delivery point customer interruptions.

Events on January 4, 2014 (15:33 hrs)

| Delivery Point Affected | Start Time | Finish Time | Duration of Interruptions (mins) | MW Load | MW-Mins |
|---|---|---|---|---|---|
| | | | | | |
| Hardwoods | 1/4/2014 15:33 | 1/4/2014 15:55 | 22 | 164 | 3,608 |
| Oxen Pond | 1/4/2014 15:33 | 1/4/2014 16:06 | 33 | 166 | 5,478 |
| Holyrood - 38L | 1/4/2014 15:33 | 1/4/2014 16:10 | 37 | 24 | 870 |
| Western Avalon - 64L | 1/4/2014 15:33 | 1/4/2014 16:18 | 45 | 61 | 2,750 |
| Come By Chance T1 | 1/4/2014 15:33 | 1/4/2014 15:39 | 6 | 15 | 91 |
| Duck Pond Mine | 1/4/2014 15:33 | 1/4/2014 17:47 | 134 | 5 | 724 |
| Wiltondale | 1/4/2014 15:33 | 1/4/2014 15:43 | 10 | 0.1 | 1 |
| Glenburine | 1/4/2014 15:33 | 1/4/2014 15:43 | 10 | 3 | 29 |
| Rocky Harbour | 1/4/2014 15:33 | 1/4/2014 15:43 | 10 | 4 | 43 |
| Grandy Brook | 1/4/2014 15:33 | 1/4/2014 15:39 | 6 | 5 | 28 |
| St Alban's (1) | 1/4/2014 15:33 | 1/4/2014 15:43 | 10 | 8 | 75 |
| Conne River | 1/4/2014 15:33 | 1/4/2014 15:43 | 10 | 2 | 22 |
| English Harbour West | 1/4/2014 15:33 | 1/4/2014 15:43 | 10 | 4 | 43 |
| Barachoix | 1/4/2014 15:33 | 1/4/2014 15:43 | 10 | 7 | 74 |
| | | | | | |
| Come By Chance T2 | 1/4/2014 15:33 | 1/4/2014 15:39 | N/A (BES: 6 mins) | N/A | N/A |
| Holyrood - 39L | 1/4/2014 15:33 | 1/4/2014 16:39 | N/A (BES: 66 mins) | N/A | N/A |
| | | | | | |
| | | **Totals** | | | 13,836 |

## Appendix C1: Significant Transmission Events – 2014 (Cont'd)

## Event 3

On January 5 at 2127 hours, the Holyrood generating Unit 1 was being prepared to be placed on line. The unit disconnect switch was closed as the first step in this procedure. After this switch was closed the unit connected to the grid, out of synch, single phase through a closed breaker contact. This resulted in a 230 KV disturbance and the tripping of Holyrood units 2 and 3, the Stephenville Gas Turbine, and the Hawke's Bay Diesel Plant.
(**Unsupplied Energy: 34,030 MW-Mins)**

The following table outlines the delivery point customer interruptions.

Events on January 5, 2014 (21:27 hrs)

| Delivery Point Affected | Start Time | Finish Time | Duration of Interruptions (mins) | MW Load | MW-Mins |
|---|---|---|---|---|---|
| | | | | | |
| Holyrood - 38L | 1/5/2014 21:27 | 1/5/2014 21:31 | 4 | 37 | 146 |
| Holyrood - 39L | 1/5/2014 21:27 | 1/6/2014 8:42 | 675 | 17 | 11,610 |
| Western Avalon - 64L | 1/5/2014 21:27 | 1/6/2014 0:22 | 175 | 83 | 14,525 |
| Western Avalon - Bus B2 | 1/5/2014 21:27 | 1/6/2014 0:36 | 189 | 41 | 7,749 |
| | | | | | |
| | | **Totals** | | | 34,030 |

## Event 4

On January 26, customers supplied by the Grandy Brook Terminal Station experienced an unplanned power outage of eight hours and 46 minutes. The outage occurred after a crossarm failed at a structure in transmission line TL250 during an extreme wind storm. There were wind gusts of over 130 km/h recorded on this day. **(Unsupplied Energy: 1,999 MW-Mins)**

## Event 5

On January 28, customers supplied by the Monkstown and Bay L'Argent Terminal Stations experienced an unplanned power outage of three hours and 10 minutes. The outage occurred after a crossarm failed at a structure in transmission line TL212 during an extreme wind storm. There were wind gusts of over 120 km/h recorded on this day. (**Unsupplied Energy: 1,121 MW-Mins)**

## Appendix C1: Significant Transmission Events – 2014 (Cont'd)

### Event 6

On February 19, Vale at Long Harbour experienced an unplanned power outage of two hours and 52 minutes. The outage was caused by transformer T1 tripping due a protection coordination issue with Vale's protection. These protection issues have since been resolved.
(**Unsupplied Energy: 1,032 MW-Mins)**

### Event 7/Event 8/Event 9

On February 23, customers supplied by the Bottom Waters Terminal Station experienced three unplanned power outages of 11 hours and 30 minutes in total. The first outage was caused by a bus lockout operation for a trip of transformer T1. The other two outages occurred during the restoration of T1. The transformer trip was caused by a faulty pressure/vacuum switch. The switch required isolation before T1 could be re-energized.
Event 7: (**Unsupplied Energy: 1,230 MW-Mins)**
Event 8: (**Unsupplied Energy: 2,700 MW-Mins)**
Event 9: (**Unsupplied Energy: 1,238 MW-Mins)**

### Event 10

On April 14, customers supplied by the Bottom Waters Terminal Station experienced an unplanned power outage of 2 hours and 32 minutes. The outage was caused by a squirrel that came into contact with a lightning arrestor on the low voltage side (25 kV) of transformer T1 resulting in the operation of the bus lockout. This, in turn, tripped circuit switcher L60T1 on the high side of T1 (138 kV).
(**Unsupplied Energy: 1,170 MW-Mins)**

### Event 11

On August 5, 7,345 customers on the Great North Peninsula experienced an unplanned power outage. The outage occurred due to a failure of an SF6 Breaker, B1L41 at the Peter's Barren Terminal Station, tripping transmission line TL241 and causing a bus lockout at the terminal station.
(**Unsupplied Energy: 2,530 MW-Mins)**

The following table outlines the delivery point customer interruptions.

## Appendix C1: Significant Transmission Events – 2014 (Cont'd)

**Event -TL241 Trip/PBN B1 Lockout**

| Delivery Point Affected | Start Time | Time of Restoration | Outage Duration (mins) | Load Loss (MW) | MW-Mins |
|---|---|---|---|---|---|
| Parson's Pond | 15:16 | 15:28 | 12 | 0.31 | 3.72 |
| Daniel's Harbour | 15:16 | 15:28 | 12 | 0.37 | 4.44 |
| Hawkes's Bay | 15:16 | 15:28 | 12 | 3.75 | 45 |
| Plum Point | 15:16 | 23:26 | 490 | 2.1 | 1029 |
| Bear Cove | 15:16 | 23:26 | 490 | 2.54 | 1244.6 |
| Main Brook | 15:16 | 15:43 | 27 | 1.7 | 45.9 |
| Roddickton | 15:16 | 15:49 | 33 | 1.4 | 46.2 |
| St Anthony | 15:16 | 15:49 | 33 | 5.3 | 111.3 |

## Event 12

On August 10, customers supplied by the Happy Valley and Muskrat Falls Construction Power Terminal Stations experienced an unplanned power outage of two hours and 40 minutes. The outage occurred when a tertiary lead on the 230/138 kV transformer T71 failed at the Churchill Falls Switchyard, resulting in a fault and a trip of the 138 kV transmission line (L1301/L1302) at the Churchill Falls switchyard.

(**Unsupplied Energy: 2,512 MW-Mins)**

## Appendix C2: Significant Distribution Events – 2014 (Excluding Fourth Quarter)

- On January 1, customers in Happy Valley - Goose Bay, Labrador serviced by feeder L16 experienced two unplanned and one emergency planned power outage. The outages occurred due to unbalanced loading on the feeder. See the following for outages details:

  Outage 1: 1745-1817 hours (32 minutes) 3,984 customers
  Outage 2: 1757 – 1811 hours (14 minutes) 1,019 customers
  (Emergency planned outage for switching operations)
  Outage 3: 1815 – 2344 hours (five hours 29 minutes) 1,019 customers

- On January 22, at 2000 hours (Labrador time), 391 customers in Labrador City, Labrador supplied by Line 13 experienced an unplanned power outage. The outage occurred when a piece of jumper conductor burned off a pole. All customers were restored at 2200 hours.

- On January 26, at 0955 hours, all customers (1369) serviced by the Barachoix Terminal Station, including the communities of Gaultois, Harbour Breton, Hermitage, and Seal Cove experienced an unplanned power outage. The outage occurred due to line damage caused by extreme weather and high winds. Hydro crews safely made the necessary repairs and all customers were restored by 1855 hours. Delays in restoration were due to distance and travel time in extreme weather, the investigation into the cause of the outage, and the repair time.

- On January 26, at 0848 hours, all customers (921) serviced by the Grandy Brook Terminal Station, including the communities of Burgeo, Grand Bruit, and La Poile, experienced an unplanned power outage. The outage occurred when the 138 kV Transmission Line TL250 tripped out of service due to a failed cross arm. There were extreme high winds at the time. Hydro crews safely made the necessary repairs and all customers were restored by 1735 hours. Delays in restoration were due to distance and travel time in extreme weather, the investigation into the cause of the outage, and the repair time.

- On January 26, at 0933 hours, all customers (813) serviced by the English Harbour West Terminal Station, including the communities of Boxey, Belleoram, Coombs Cove, English Harbour West, Mose Ambrose, Pools Cove, Rencontre East, St. Jacques, and Wreck Cove experienced an unplanned power outage. The exact cause of the outage is unknown, however it was most likely due to the extreme weather and high winds experienced at the time. All customers were restored by 1323 hours.

- On April 10, at 1400 hours (Labrador time), 330 customers in Happy Valley - Goose Bay, Labrador serviced by Line 7 experienced a planned power outage. The outage was required to safely replace a utility pole. All customers were restored at 1650 hours.

- On April 14, at 0825 hours, 1774 customers serviced by the Bottom Waters Terminal Station experienced an unplanned power outage. The outage occurred when the 138 kV circuit breaker L60T1 tripped open. This circuit breaker is located on the high voltage side (138 kV) of the transformer - T1. Hydro investigated and discovered that a squirrel had come in contact with a lightning arrestor on the low voltage side (25 kV) of the transformer and the

protection systems for transformer T1 commanded circuit breaker L60T1 to trip. All customers were restored by 1057 hours.

- On April 16, at 1906 hours, all customers (990) serviced by the L'Anse au Loup Substation experienced an unplanned power outage. The outage occurred due to a loss of supply from Hydro Québec. Communities affected include L'Anse Amour, English Point, Buckle's Point, Forteau, L'Anse au Clair, L'Anse au Loup, West St. Modeste, Capstan Island, L'Anse au Diable, Pinware, Red Bay, and Organ's Island.

  The L'Anse au Loup Diesel Plant was used to restore customers.

  Customer Outage details are as follows:

  Outage 1: 1906 – 1927 hours (21 minutes), 467 customers between L'Anse au Loup to Pinware
  Outage 2: 1906 – 1935 hours (29 minutes), 262 customers in L'Anse Amour and Forteau
  Outage 3: 1906 – 1942 hours (36 minutes), 124 customers in L'Anse au Clair
  Outage 4: 1906 – 1950 hours (44 minutes), 137 customers in Red Bay

  Supply was restored from Hydro Québec at 2330 hours, April 17.

- On May 07, at 0130 hours (Labrador time), 140 customers in Cartwright, Labrador experienced an unplanned power outage. The outage occurred when one phase in a distribution line faulted. Hydro investigated and made the necessary repairs to the line. All customers were restored at 0400 hours.

- On May 22, at 1225 hours, all customers (990) serviced by the L'Anse au Loup Substation experienced an unplanned power outage. The outage occurred due to a loss of supply from Hydro Québec. Hydro Québec reported a pole down. Communities affected include L'Anse Amour, English Point, Buckle's Point, Forteau, L'Anse au Clair, L'Anse au Loup, West St. Modeste, Capstan Island, L'Anse au Diable, Pinware, Red Bay, and Organ's Island.

  The L'Anse au Loup Diesel Plant was used to restore customers.

  Customer Outage details are as follows:

  Outage 1: 1225 – 1236 hours (11 minutes), 467 customers between L'Anse au Loup to Pinware
  Outage 2: 1225 – 1241 hours (16 minutes), 262 customers in L'Anse Amour and Forteau
  Outage 3: 1225 – 1245 hours (20 minutes), 124 customers in L'Anse au Clair
  Outage 4: 1225 – 1251 hours (26 minutes), 137 customers in Red Bay

  Supply from Hydro Québec was restored at 1312 hours.

- On May 23, at 2344 hours, all customers (990) serviced by the L'Anse au Loup Substation experienced an unplanned power outage. The outage occurred due to a loss of supply from Hydro Québec. Hydro Québec reported a problem at their Blanc-Sablon Station. Communities affected include L'Anse Amour, English Point, Buckle's Point, Forteau, L'Anse

au Clair, L'Anse au Loup, West St. Modeste, Capstan Island, L'Anse au Diable, Pinware, Red Bay, and Organ's Island.

The L'Anse au Loup Diesel Plant was used to restore customers. All customers were restored by 0034 hours May 24.
Supply from Hydro Québec was restored at 1038 hours May 24.

- On June 08, at 0600 hours (Labrador time), all customers (5813), including Industrial Customers IOCC and Wabush Mines, in Labrador City and Wabush experienced a planned power outage. The outage was required so that CF(L)Co could safely perform maintenance on the Wabush Terminal Station.

  See the following for the number of affected customers and restoration times:

  Wabush: 2006 hours (1466 customers – 14 hours six minutes)
  Labrador City: 2020 hours (4347 customers – 14 hour 20 minutes)

- On June 25, at 1025 hours (Labrador time), all customers (226) in Port Hope Simpson, Labrador experienced a planned power outage. The outage was required to safely disconnect Mobile Unit 2044. All customers were restored at 1150 hours.

- On July 01, 175 customers in Labrador City, Labrador serviced by Lines 18 and 21 experienced a planned power outage. The outage was required to perform voltage conversion upgrades to the distribution system. Outage duration was four hours.

- On July 02, at 0645 hours (Labrador time), 5677 customers in Labrador City and Wabush, Labrador experienced an unplanned power outage. The outage occurred when a fault at the IOCC mine site activated relay protection at the Wabush Terminal Station, tripping breakers 46-32 (Labrador City) and 46-36 (Wabush). See the following for customer restoration details:

  Outage 1: 1467 Wabush customers, 35 minutes
  Outage 2: 4210 Labrador City customers, one hour

- On July 05, 400 customers in Sheshatshui, Labrador serviced by Happy Valley Terminal Station Line 7, experienced a planned power outage. The outage was required to install new equipment on the distribution system. Outage duration was three hours and 40 minutes.

- On July 12, 350 customers in Labrador City, Labrador serviced by Lines 6 and 15 experienced a planned power outage. The outage was required to perform voltage conversion upgrades to the distribution system. Outage duration was five hours.

- On July 13, 350 customers in Labrador City, Labrador serviced by Lines 6 and 15 experienced a planned power outage. The outage was required to perform voltage conversion upgrades to the distribution system. Outage duration was five hours.

- On July 16, all customers (170) on Long Island including the communities of Beaumont and Lushes Bight experienced an unplanned power outage of seven hours and 30 minutes. Hydro's preliminary investigation indicated a subsea cable failure was the cause of the outage. Hydro attempted to energize the primary and all backup cables without success. Hydro involved additional technical and support staff to assist with the restoration efforts. Hydro had also begun to mobilizing a portable diesel generator to site. Power was restored to Long Island via one of the submarine cables. Preliminary investigation indicates three of the four cables have been damaged and remain out of service. Hydro is arranging for inspection of the cables to determine the cause of the outage and why the other cables could not be energized. Preparations are being made to execute repairs, pending the findings from the inspection. In the interim, standby backup generation has been installed on Long Island should the existing energized cable fail.

- On August 21, all customers (1,466) in Wabush, Labrador experienced a planned power outage of nearly two and a half hours in duration. The outage was required to tie in transformers T3 and T5 at the Wabush Substation. This work was required to energize T5 for condition assessment and monitoring.

- On August 26, 451 customers serviced by Bottom Waters Terminal Station Line 4 are experienced an unplanned power outage of approximately 19 hours in duration. The communities affected included Burlington, Smith's Harbour, and Middle Arm. The outage was caused by a failure of a step-down transformer located in the Burlington Substation. Hydro expedited a replacement transformer from the Bishop's Falls warehouse. Hydro crews worked late into the evening of August 26 and resumed work during the morning of August 27, during which time the replacement of the transformer was completed and all customers were restored.

- On September 07, 723 customers in Labrador City, Labrador, serviced by Line 8, experienced a planned power outage. The outage was required to connect new feeders into the Quartzite Substation. Outage duration was three hours.

- On September 11, all customers (874) in Little Bay and King's Point, serviced by the Springdale Terminal Station, experienced an unplanned power outage. The outage occurred when Newfoundland Power's mobile substation, located in the Springdale Terminal Station, failed causing Hydro's breakers to trip. Newfoundland Power made the necessary repairs to mobile substation, Hydro then proceeded to restore supply to customers. Outage duration was seven hours and 43 minutes.

- On September 14, all customers (1466) in Wabush, Labrador experienced a planned power outage. The outage was required to make modifications to the steel structure within the Wabush Substation yard in preparation for the connection of an additional power transformer. Outage duration was five hours and 45 minutes.

- On September 21, all customers (1459) in Wabush, Labrador experienced an extended planned power outage. The outage was required for the installation of a new power transformer (T6) at the Wabush Substation. All customers were planned to be restored by 1000 hours, however due to an issue with breaker WA36-CB1 at the Wabush Substation, the outage was extended beyond this time. Hydro crews resolved the issue with the breaker. Outage duration was eight hours and 15 minutes.

- On September 22, 1765 customers serviced by the Bottom Waters Terminal Station Lines 1 and 3 experienced an unplanned power outage. The communities affected include Brent's Cove, Burlington, Harbour Round, La Scie, Middle Arm, Ming's Bight, Nipper's Harbour, Pacquet, Round Harbour, Snook's Arm, Shoe Cove, Smith's Harbour, Tilt Cove and Woodstock. This outage also affected Rambler Mines. The outage was caused by rain and high winds in the area blowing trees into the distribution lines. Hydro crews responded, patrolled the lines, and safely removed any trees prior to restoring customers. Outage duration was five hours and 10 minutes.

- On September 26, 446 customers in Labrador City, Labrador serviced by Quartzite Substation Line 13 and Bartlett Substation Line 4 experienced a planned power outage. The outage was required to perform voltage conversion upgrades to the distribution system. Outage duration was three hours.

- On September 27, 311 customers in Labrador City, Labrador serviced by Quartzite Substation Line 13 and Bartlett Substation Line 4 experienced a planned power outage. The outage was required to perform voltage conversion upgrades to the distribution system. Outage duration was two hours and 30 minutes.

## Appendix C3: Underfrequency Load Shedding Events (Excluding Fourth Quarter)

- On January 10, Holyrood Generating Unit No. 2 tripped. The trip of Unit 2 occurred when a compressor failure resulted in an outage to a 600V power center. This power center supplies auxiliary equipment associated with Unit 2 turbine/boiler. Unit 2 was restored to service at 0123 hours January 11. With the removal of generation (approximately 155 MW) the system frequency dropped to 58.25 Hz resulting in the activation of the under frequency protection at Hydro and Newfoundland Power. Total system load at the time of the incident was 1,306 MW. Hydro customers (2,210) were restored within three minutes. Newfoundland Power customers (21,067) were restored in twenty-two load blocks. The first customers were restored in seven minutes and all customers were reported to be restored within 28 minutes after the event occurred. **(Unsupplied Energy: 1,568 MW-Mins)**

- On January 12, Holyrood Generating Unit No. 3 tripped. The under frequency trip occurred when a main feed water isolator did not electrically open. As a result Unit 3 tripped on low drum level. Hydro determined that the problem was with a control power signal from the local control system. Repairs were made and the Unit was restored to service at 1830 hours, January 12. With the removal of generation (approximately 66 MW) the system frequency dropped to 58.78 Hz resulting in the activation of the under frequency protection at Newfoundland Power. Total system load at the time of the incident was 1,030 MW. All Newfoundland Power customers (5,750) were restored within 10 minutes after the event occurred. **(Unsupplied Energy: 220 MW-Mins)**

- On January 15, transmission line TL-201 (from the Western Avalon to Hardwoods terminal stations) tripped and remained open. The fault created a system disturbance which activated the rate of change (df/dt) underfrequency load shedding protection at Newfoundland Power. The decline in system frequency achieved a maximum value of 0.56 Hz/Sec. All Newfoundland Power customers (3,307) were restored within 1 minute after the event occurred. Total NLH system load at the time of the incident was 998 MW. Upon investigation through line patrol, it was determined that two phases on structure 157 had fallen to the ground after the insulators had separated. The immediate cause is suspected to be a mechanical insulator failure due to high winds and adverse weather. The insulators were replaced and the line was restored to service at 2229 hours on January 15. **(Unsupplied Energy: 15 MW-Mins)**

- On January 27, at 1650 hours, Holyrood Generating Unit No. 1 tripped. Hydro's investigation into the cause of the trip on Unit 1 determined that a circuit breaker supplying the burner management system was inadvertently tripped as corrective maintenance was carried out on another piece of equipment located in the same electrical cabinet. With the removal of generation (approximately 120 MW) the system frequency dropped to 58.56 Hz resulting in the activation of the under frequency protection at Newfoundland Power. Total system load at the time of the incident was 1,248 MW. All Newfoundland Power customers (11,061) were reported to be restored within 18 minutes after the event occurred. **(Unsupplied Energy: 904 MW-Mins)**

## Appendix C3: Underfrequency Load Shedding Events (Excluding Fourth Quarter) (cont'd)

- On January 30, at 0509 hours, Bay d'Espoir Generating Unit No. 6 tripped. The unit trip was caused by the failure of the rectifying transformer associated with the unit excitation system. The spare transformer was installed. With the removal of generation (approximately 64 MW) the system frequency dropped to 58.71 Hz resulting in the activation of the under frequency protection at Newfoundland Power and Corner Brook Pulp and Paper. Total system load at the time of the incident was 1,060 MW. All Newfoundland Power customers (6,087) were reported to be restored within four minutes after the event occurred. **(Unsupplied Energy: 107 MW-Mins)**

- On February 17, at 0422 hours, Bay d'Espoir Generating Unit No. 6 tripped. The unit trip was caused by the failure of the rectifying transformer (this time the spare unit which was installed following the failure on January 30). With the removal of generation (approximately 67 MW) the system frequency dropped to 58.58 Hz resulting in the activation of the under frequency protection at Newfoundland Power. Total system load at the time of the incident was 1,053 MW. 15,108 Newfoundland Power customers were reported to be restored within five minutes after the event occurred. Unit No. 6 remains out of service. **(Unsupplied Energy: 240 MW-Mins)**

- On March 18, at 2203 hours, while taking Bay d'Espoir Unit 4 offline, the unit breaker mis-operated, causing a bus lockout of Bus 2 at Bay d'Espoir, and tripping Unit 3 offline. With the removal of generation (approximately 59 MW) the system frequency dropped to 58.72 Hz resulting in the activation of the under frequency protection at Newfoundland Power and Corner Brook Pulp and Paper. Total system load at the time of the incident was 1,184 MW. There were 7,225 Newfoundland Power customers reported to be restored within five minutes after the event occurred. **(Unsupplied Energy: 190 MW-Mins)**

- On July 14, at 1414 hours, while Holyrood Unit 3 was undergoing a load test, a problem with the forced draft fans caused the unit to trip offline. With the removal of generation (approximately 113 MW) the system frequency dropped to 58.79 Hz resulting in the activation of the under frequency protection at Newfoundland Power. Total system load at the time of the incident was 598 MW. All Newfoundland Power customers were reported to be restored within 16 minutes after the event occurred. Load Shed: Newfoundland Power: 13 MW **(Unsupplied Energy: 208 MW-Mins)**

## Appendix C3: Underfrequency Load Shedding Events (Excluding Fourth Quarter) (cont'd)

- On July 28, at 0728 hours, Holyrood Unit 3 tripped offline. Hydro's investigation into this incident indicated that the root cause stemmed from an issue that occurred during switching, related to an abnormal configuration of the plant's electrical distribution system which was required for planned maintenance at the Holyrood Thermal Generating Station (HTGS). With the removal of generation (approximately 71 MW) the system frequency dropped to 58.41 Hz resulting in the activation of the under frequency protection at Newfoundland Power. Total system load at the time of the incident was 491 MW. All Newfoundland Power customers were reported to be restored within 18 minutes after the event occurred. Load Shed: Newfoundland Power: 19.5 MW **(Unsupplied Energy: 351 MW-Mins)**

- On July 29, at 0943 hours, Holyrood Unit 3 tripped offline. Analysis concluded the root cause of the incident was a lack of clear communication during switching for a planned equipment maintenance outage in the Holyrood Terminal Station (HRD TS). The investigation also found that this specific outage type had not been executed by all control room operators in the past, highlighting the need for a better understanding of this outage type. Hydro has and continues to communicate this incident internally via lessons learned and training programs. With the removal of generation (approximately 70 MW) the system frequency dropped to 58.50 Hz resulting in the activation of the under frequency protection at Newfoundland Power. Total system load at the time of the incident was 588 MW. All Newfoundland Power customers were reported to be restored within 11 minutes after the event occurred. Load Shed: Newfoundland Power: 40 MW **(Unsupplied Energy: 440 MW-Mins)**

# Appendix D: List of U.S.-Based Peers for Financial KPI Benchmarking

**Updated May 2015**

| **Generation and Corporate Peer Group:** | **Transmission Peer Group:** |
|---|---|
| Alcoa Power Generating Inc. | AEP Texas North Company |
| Allete, Inc. | Allete, Inc. |
| Aquila, Inc. | Aquila, Inc. |
| Avista Corporation | Avista Corporation |
| Buckeye Power, Inc. | Central Illinois Public Service Company |
| Cleco Power LLC | Delmarva Power & Light Company |
| Electric Energy, Inc. | Entergy Mississippi, Inc. |
| Entergy Mississippi, Inc. | Kentucky Utilities Company |
| Indiana-Kentucky Electric Corporation | MDU Resources Group, Inc. |
| Kentucky Power Company | Mississippi Power Company |
| Ohio Valley Electric Corporation | New York State Electric & Gas Corporation |
| Portland General Electric Company | Northern Indiana Public Service Company |
| Public Service Company of New Hampshire | Northern States Power Company (Wisconsin) |
| Puget Sound Energy, Inc. | Oklahoma Gas and Electric Company |
| Sierra Pacific Power Company | Public Service Company of Colorado |
| Southern Electric Generating Company | Public Service Company of Oklahoma |
| Southern Indiana Gas and Electric Company | Sierra Pacific Power Company |
| The Empire District Electric Company | Southwestern Electric Power Company |
| | Tucson Electric Power Company |
| | Westar Energy, Inc. |

**A REPORT TO**
**THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES**

# 2015 ANNUAL REPORT
**ON**
# KEY PERFORMANCE INDICATORS

*Pursuant to Order No. P.U. 14 (2004)*

## NEWFOUNDLAND AND LABRADOR HYDRO

## TABLE OF CONTENTS

1 Introduction ..... 3
2 Overview of Key Performance Indicator Results ..... 4
2.1 Overview ..... 4
3 Performance Indices ..... 6
3.1 Reliability Performance Indicators ..... 6
*3.1.1 Reliability KPI: Generation* ..... 6
3.1.1 c) Generation Equipment Performance ..... 8
*3.1.2 Reliability KPI: End User Performance* ..... 10
*3.1.3 Reliability KPI: Transmission* ..... 13
*3.1.4 Reliability KPI: Distribution* ..... 20
3.1.4 c) Additional Information ..... 22
*3.1.5 Reliability KPI: Other* ..... 26
3.2 Operating Performance Indicators ..... 29
*3.2.1 Operating KPI: Generation* ..... 29
3.3 Financial Performance Indicators ..... 31
3.4 Customer-Related Performance Indicators ..... 36

Appendix A: Rationale for Hydro's 2015 KPI Targets
Appendix B: Computation of Weighted Capability Factor and Factors Impacting Performance
Appendix C1: Significant Transmission Events – 2015
Appendix C2: Significant Distribution Events – 2015 (Excluding Fourth Quarter)
Appendix C3: Underfrequency Load Shedding Events (Excluding Fourth Quarter)
Appendix D: List of U.S.-Based Peers for Financial KPI Benchmarking

# 1 Introduction

In Order No. P.U. 14(2004), the Board required Newfoundland and Labrador Hydro (Hydro) to file appropriate historic, current and forecast comparisons of reliability, operating, financial and other Key Performance Indicators (KPIs). These were ordered to be filed with Hydro's annual financial report, commencing in 2004.

In compliance with the above Order, Hydro has 14 individual KPIs within the following four general categories: Reliability; Operating; Financial; and Customer-Related.

Within each of these categories, KPI data is reported on a historic basis for Hydro. Where appropriate, KPIs are subcategorized based on whether they relate to generation, transmission, distribution or overall corporate activity. For most of the Reliability KPIs, data from the Canadian Electricity Association (CEA) is provided in this report, as has been the case in prior years. At the time of this report, CEA data has been published only to 2014. CEA data is unavailable for underfrequency load shedding, a reliability KPI, as this measure is unique to Hydro's Island Interconnected System. In the Operating category, the KPIs used to measure performance relate to two specific facilities within Hydro's system: Bay d'Espoir and Holyrood. For these two generation plants, performance is measured and compared on a year-over-year basis.

Section 2 of this report provides an overview of Hydro's KPI performance in 2015 compared with the prior year as well as a comparison of actual KPI results compared with targets.

Section 3 of this report provides a detailed analysis of each individual KPI within the four categories named above in Section 3. In addition, it provides fourth quarter data for transmission and distribution reliability which is routinely included in Hydro's quarterly regulatory reports.

Section 3.3 Financial Performance Indicators are not yet available but will follow after the audited financial statements are available.

The 2015 financial data and 2016 targets in Section 4 Data Table of Key Performance Indicators are not available at this time. This section will be re-filed after the financial data is available and the 2016 target levels have been established.

# 2 Overview of Key Performance Indicator Results

## *2.1 Overview*

A number of key indices measured by Hydro showed improvement when compared to 2014 or the targets for 2015. All indices are discussed in the following sections of this Appendix.

Generation availability did not change significantly in 2015 when compared to 2014. Hydro's overall Weighted Capability factor, which measures generating unit availability, held at 80% in 2015, the same as for 2014. The availability of the Holyrood thermal plant held at 64% in 2015, the same (63.4%) as for 2014. The availability of gas turbines improved to 80%, the same as for 2014. The availability of Hydro's hydraulic plants held at 88% in 2015, the same as for 2014. With the exception of Unit 1 at the Bay d'Espoir generating station, Hydro's hydraulic units' availability was consistent with historic performance. Impacting on the overall hydraulic unit availability was a vibration and bearing issue on Unit 1.

- The Derating-Adjusted Forced Outage Rate (DAFOR) performance across all generation classes improved considerably to 3.4% in 2015, compared to 8.2% in 2014. The thermal DAFOR improved to 5.0% in 2015 from 13.7% in 2014.
- Both the frequency and duration of transmission delivery point outages improved in 2015, compared to 2014.
- The 2015 hydraulic conversion factor at Bay d'Espoir was affected by lower reservoirs levels then experienced in previous years. The target was met in 2015 for this measure.

Other indices did not exhibit the same improvement in comparison to the 2014 performance or the 2015 target.

- Undefrequency load shedding performance improved to eight events in 2015, compared to 14 events in 2014. The 2015 target of six events was not met.
- Overall Transmission and Distribution reliability were impacted by an increase in planned outages in 2015, offset by a reduction in the number and duration of forced outages as indicated above.

The 2015 operating KPI for energy conversion at Holyrood was primarily impacted by the low heating content in the fuel consumed at the plant in addition to a lower average unit loading.

A review of all indices is contained in the following sections.

## 2.2 Performance in 2015 versus 2015 Target

The table below summarizes Hydro's KPI performance in 2015. The rationale for the 2015 targets was summarized in the February 2015 report to the Board entitled *2014 Annual Report on Key Performance Indicators*. The 2015 rationale is included in this report as Appendix A.

| Category | KPI | Units | 2015 Target | 2015 Results |
|---|---|---|---|---|
| Reliability | Weighted Capability Factor (WCF) | % | 83.8[1] | 79.9 |
| | DAFOR | % | 2.7 | 3.4 |
| | T-SAIDI | Minutes/Point | N/A[2] | 476[3] |
| | T-SAIFI | Number/Point | N/A | 3.1 |
| | T-SARI | Minutes/Outage | N/A | 154 |
| | SAIDI | Hours/Customer | 10.5 | 17.5 |
| | SAIFI | Number/Customer | 4.6 | 7.0 |
| | End User SAIDI[4] | Hours/Customer | 1.9 | 3.1 |
| | End User SAIFI[4] | Number/Customer | 1.1 | 2.0 |
| | Underfrequency Load Shedding | # of events | 6 | 8 |
| Operating | Hydraulic CF | GWh/MCM | 0.433 | 0.433 |
| | Thermal CF | kWh/BBL | 607 | 602 |
| Financial | Controllable Unit Cost | $/MWh | Not Available | |
| Other | Customer Satisfaction (Residential) | Max=100% | | |

[1] The Weighted Capability Factor target is based on planned annual maintenance outages, an allowance for other short duration maintenance outages and targeted forced outage durations.
[2] Transmission targets (T-SAIDI, T-SAIFI, and T-SARI) were not set for 2015.
[3] Transmission and distribution reliability performance is measured on combined planned and unplanned outages.
[4] New measure for 2015, refer to section 3.1.2 for further details.

# 3 Performance Indices

The following defines and describes detailed Key Performance Indicator data within four general categories: Reliability, Operating, Financial, and Customer-Related.

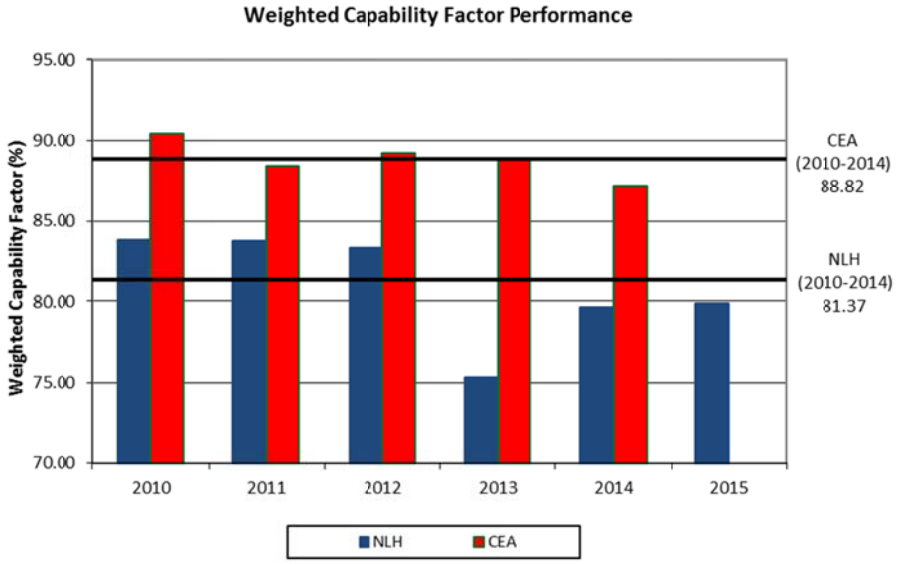
## *3.1 Reliability Performance Indicators*

Hydro monitors reliability performance with eight separate metrics. These metrics have been divided into the following subcategories: Generation, Transmission, Distribution, and Other.

### *3.1.1 Reliability KPI: Generation*

**3.1.1 a) Weighted Capability Factor (WCF) –** *a reliability KPI for generation assets that includes Hydro's thermal, gas turbine and hydroelectric generation assets on the Island and Labrador Interconnected Systems. The WCF measures the percentage of the time that a unit or a group of units is available to supply power at maximum continuous generating capacity. The factor is weighted to reflect the difference in generating unit sizes, meaning larger units have a greater impact on this measure.*

In 2015, Hydro's WCF was 79.9%, compared to 79.7% in 2014 and a target of 83.8%. The 2010 to 2014 Hydro five-year average (as last reported to the CEA) is 81.4%. The annual target for availability includes the time that units are out for maintenance. Therefore, the capability in any year is affected by the maintenance and capital work planned for that year.



Thermal unit WCF was 63.6% in 2015 compared to 63.4% in 2014. The 2015 Thermal WCF target was 67.3%. Holyrood Unit 1 had a capability factor of 68.8%, Unit 2 had a capability factor of 65.2%, and Unit 3 had a capability factor of 56.2%. Holyrood unit maintenance and planned outages were completed within the intended timeframes. Unit 3 experienced planned outages of approximately five months in total throughout the year. A Holyrood unit was operated throughout the summer months in 2015 in order to support the transmission into the Avalon Peninsula with the exception of the period of the total plant outage in August.

Overall, the hydraulic unit WCF performance was 88.0%, compared to 87.9% in 2014 and a target of 91.9%. The primary driver for the 88.0% WCF was the forced extension of a planned outage and a derating to Bay d'Espoir Unit 1. The planned annual maintenance was scheduled from April 26 to May 15, and this was extended to July 7. The unit was derated to 45 MW from 77 MW from July 8 to September 30. The problem with the unit involved vibration issues which necessitated the replacement of the thrust bearing. Removing the impact of the issue on Bay d'Espoir Unit 1 from the hydraulic WCF, results in an annual hydraulic WCF outcome of 90.5%.

Gas turbine availability improved to 80.2% in 2015 from 76.9% in 2014. The 2015 gas turbine WCF target was 85.6%.

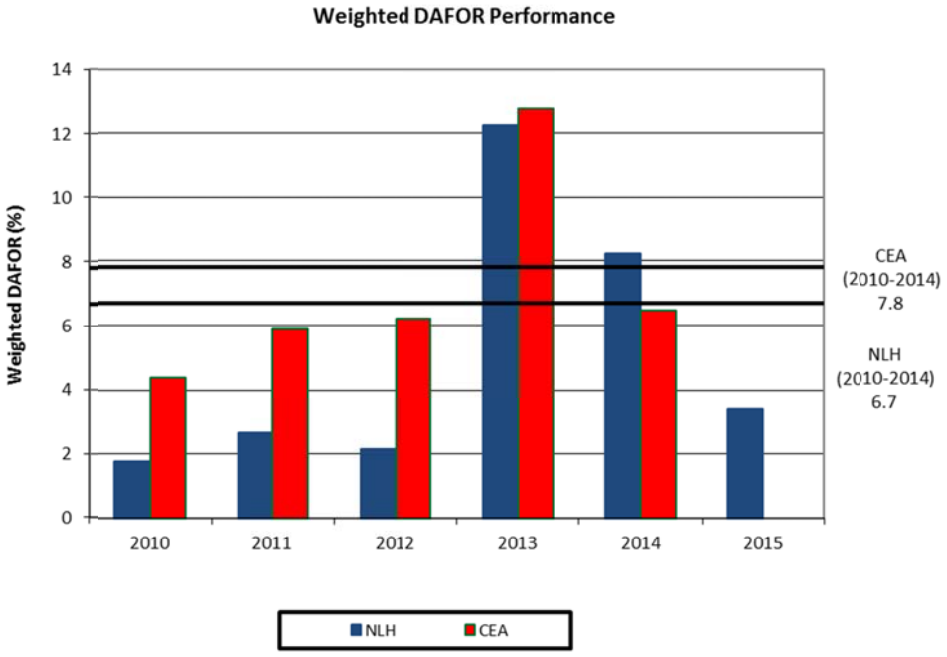
Calculation details for weighted capability as well as a list of factors that can impact KPI performance are included in Appendix B of this report.

**3.1.1 b) Weighted Derating-Adjusted Forced Outage Rate (DAFOR)** - *a reliability KPI for generation assets that includes Hydro's thermal and hydroelectric generation assets on the interconnected systems[5]. DAFOR measures the percentage of the time that a unit or group of units is unable to generate at its Maximum Continuous Rating (MCR) due to forced outages. The KPI is weighted to reflect differences in generating unit sizes.*

In 2015, Hydro's weighted DAFOR improved considerably to 3.4%, compared to 8.3% in 2014. The 2015 target was 2.7%. The thermal DAFOR for 2015 improved to 5.0%, compared to 13.7% in 2014 and a target of 8.0%. The hydraulic DAFOR was 2.7% compared to 5.9% in 2014 and a target of 0.6%. The hydraulic DAFOR was impacted by the Bay d'Espoir Unit 1 vibration and bearing issues, as described in the previous section. These issues contributed approximately 82% to the overall 2015 hydraulic DAFOR.

Hydro's overall weighted DAFOR for the period 2010 to 2014 is 6.7%, 1.1% better than the equivalently weighted national average of 7.8% for the same period.

[5] DAFOR is not applicable to the gas turbines because of the gas turbines' low operating hours.




### *3.1.1 c) Generation Equipment Performance*

The table below highlights the various performance indices for Hydro's generation facilities. Indices for 2014 and for the latest five year CEA national average (2010-2014) are included for comparison.

**Generation Performance Indices**

| Index | | Hydro | Thermal | Gas Turbine |
|---|---|---|---|---|
| **Failure Rate** (Forced Outages per 8,760 operating hours) | NLH 2015 | 1.34 | 9.07 | 57.01 |
| | NLH 2014 | 2.71 | 11.72 | 160.36 |
| | CEA '10-'14 | 2.06 | 7.79 | 69.93 |
| **Incapability Factor** (Percent of Time) | NLH 2015 | 11.70 | 36.60 | 27.21 |
| | NLH 2014 | 11.30 | 36.41 | 23.06 |
| | CEA '10-'14 | 11.18 | 26.33 | 15.84 |
| **Derating Adjusted Forced Outage Rate** (Percent of Time) | NLH 2015 | 2.67 | 5.03 | |
| | NLH 2014 | 5.97 | 13.74 | |
| | CEA '10-'14 | 5.12 | 13.14 | |
| **Utilization Forced Outage Probability** (Percent of Time) | NLH 2015 | | | 10.55 |
| | NLH 2014 | | | 14.34 |
| | CEA '10-'14 | | | 19.95 |

**Hydraulic Unit Performance**

The forced extension of the annual planned outage and subsequent unit derating on Unit 1 at Bay d'Espoir, resulting from the vibration and bearing issues, impacted the Incapability Factor for hydraulic unit measures in 2015. However, both the Failure Rate and DAFOR performance in 2015 was significantly better than in 2014 and the national five year averages.

**Thermal Unit Performance**

Thermal unit performance improved considerably in 2015 in the areas of Failure Rate and DAFOR, when compared to 2014. Incapability Factor performance declined slightly in 2015, when compared to 2014, primarily due to an extended planned annual outage on Holyrood Unit 3.

**Gas Turbine Unit Performance**

The Failure Rate and Utilization Forced Outage Probability (UFOP) performance of Hydro's gas turbines also improved considerably in 2015 when compared to 2014. Of particular importance to Hydro's gas turbines fleet is the UFOP which measure the degree to which a standby unit can be called upon to supply load when requested. The UFOP in 2015 was 10.6%, improving from 14.3% in 2014 and the CEA five year average of 20.0%. Incapability Factor performance declined in 2015, when compared to 2014, primarily due to an extended planned outage at Happy Valley.

### *3.1.2 Reliability KPI: End User Performance*

This performance index was developed to measure the reliability of all end users of electricity in the province supplied by Hydro. The measure is a combination of Hydro's service continuity data and Newfoundland Power (NP) service continuity data for Loss of Supply outages resulting from events on Hydro's transmission system. Therefore, the SAIFI and SAIDI data below is a measure of the duration and frequency of service interruptions experienced as a result of Hydro system events. This does not reflect interruptions to NP customers from issues on NP system.

Targets were developed using the past performance of Hydro and NP service continuity data. The effects of January 11, 2013 and January 2 to 8, 2014 significant interruptions were removed from the data and a modified 2010 to 2014 five year average was created. These events were removed due to the significant effect these events had on the five year data set. This is a normal practice of utilities to remove data associated with major events. This modified average was then compared to the 2013 CEA Region 2 Loss of Supply outcome.

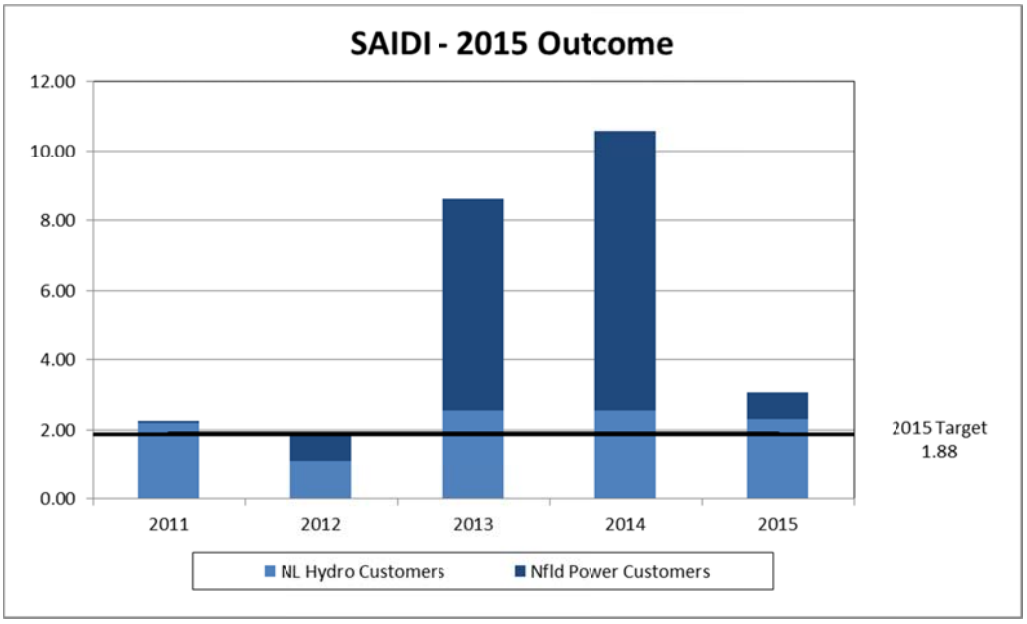
The SAIFI and SAIDI values add cumulatively through the year, with the final target for SAIFI being 1.08 and the final SAIDI being 1.88.

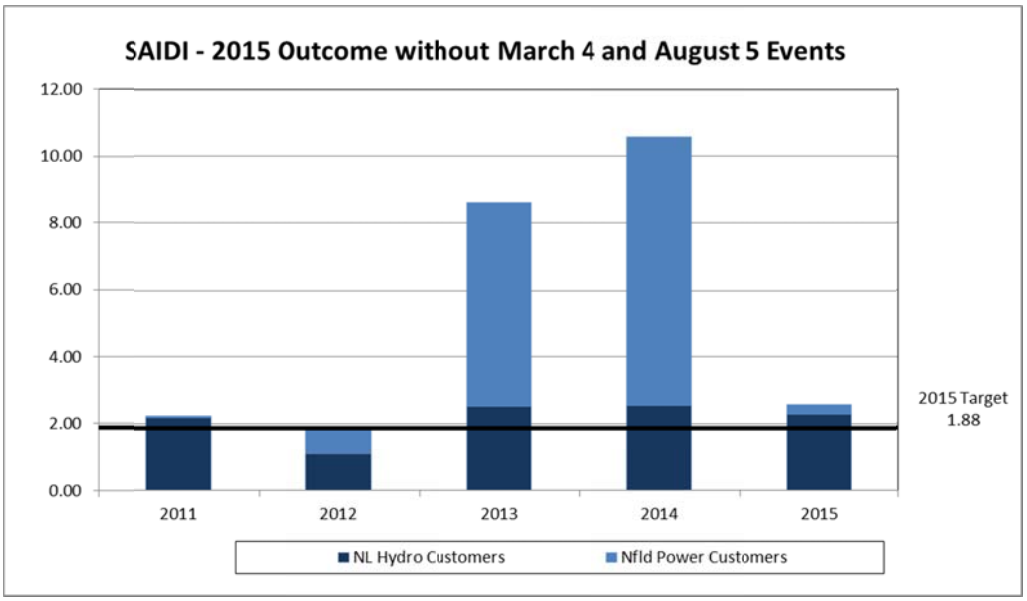
**End User Service Continuity Performance**

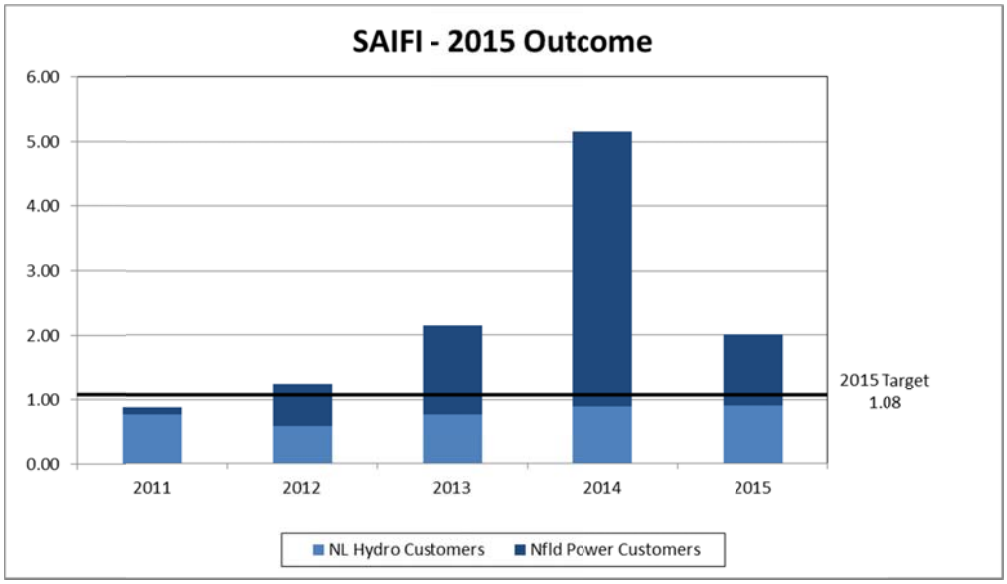
| | SAIFI | SAIDI |
|---|---|---|
| **2015 Q4** | 0.43 | 0.66 |
| **2015 Outcome** | 2.00 | 3.07 |
| **Annual Target** | 1.08 | 1.88 |

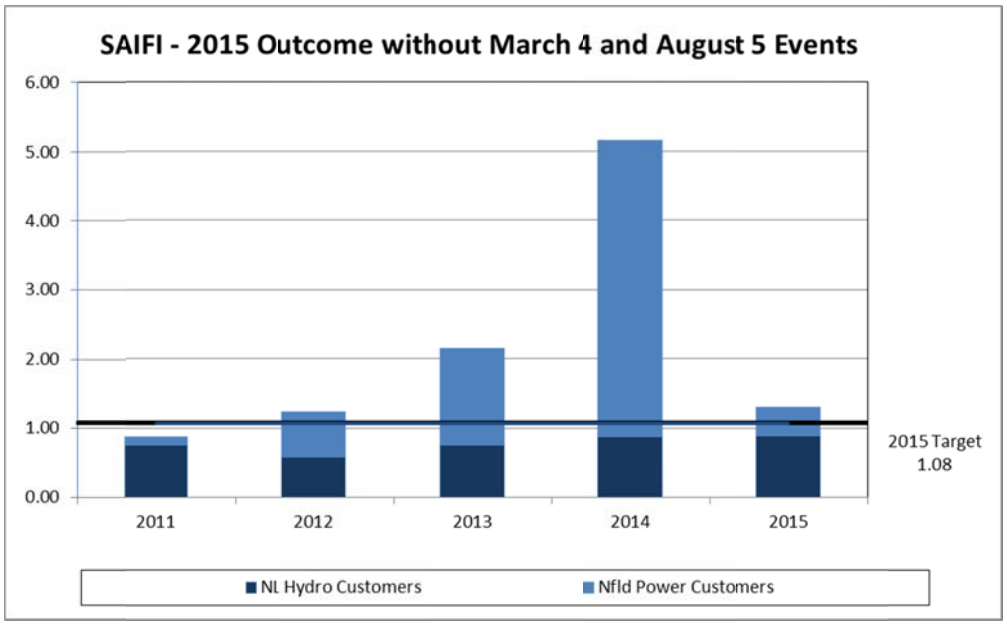
The fourth quarter performance was affected by three underfrequency events. These events are described in a later section. NP customers were also affected by planned transmission outages in the fourth quarter. Hydro's fourth quarter performance was affected by planned outages in Rocky Harbour, Nain, and in Labrador West for the distribution system upgrades.

Overall in 2015, NP customers were affected by two significant events resulting from Hydro system events; the March 4 undervoltage event and the August 5 underfrequency event. These two events contributed approximately 60% of the overall SAIFI and SAIDI for NP customers and without these two events, the 2015 SAIFI would be 1.31 and the SAIDI would be 2.58. These are compared to annual targets of 1.08 for SAIFI and 1.88 for SAIDI.


SAIDI - 2015 Outcome
12.00
10.00
8.00
6.00
4.00
2.00
0.00
2011
2012
2013
2014
2015
2015 Target
1.88
NL Hydro Customers
Nfld Power Customers


SAIDI - 2015 Outcome without March 4 and August 5 Events
12.00
10.00
8.00
6.00
4.00
2.00
0.00
2011
2012
2013
2014
2015
2015 Target
1.88
NL Hydro Customers
Nfld Power Customers


SAIFI - 2015 Outcome
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2011
2012
2013
2014
2015
2015 Target
1.08
NL Hydro Customers
Nfld Power Customers

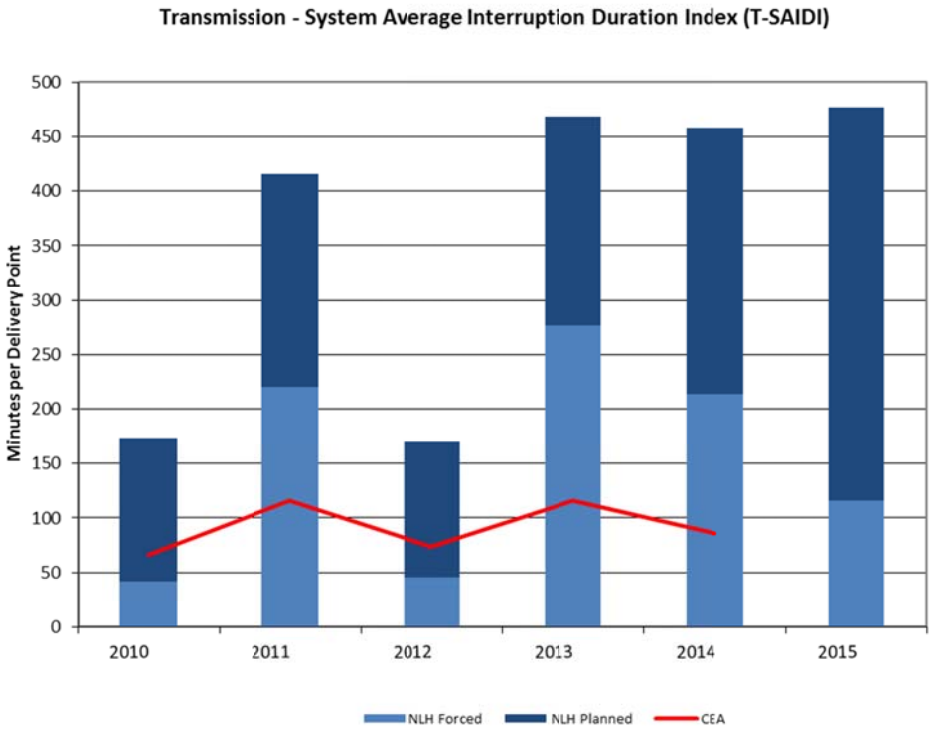

SAIFI - 2015 Outcome without March 4 and August 5 Events
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2011
2012
2013
2014
2015
2015 Target
1.08
NL Hydro Customers
Nfld Power Customers

### *3.1.3 Reliability KPI: Transmission*

**3.1.3 a) Transmission System Average Interruption Duration Index (T-SAIDI)** - *reliability KPI for bulk transmission assets which measures the average duration of outages in minutes per delivery point.*

The fourth quarter T-SAIDI was 128 minutes per delivery point (forced and planned combined) compared to 96 minutes in 2014.

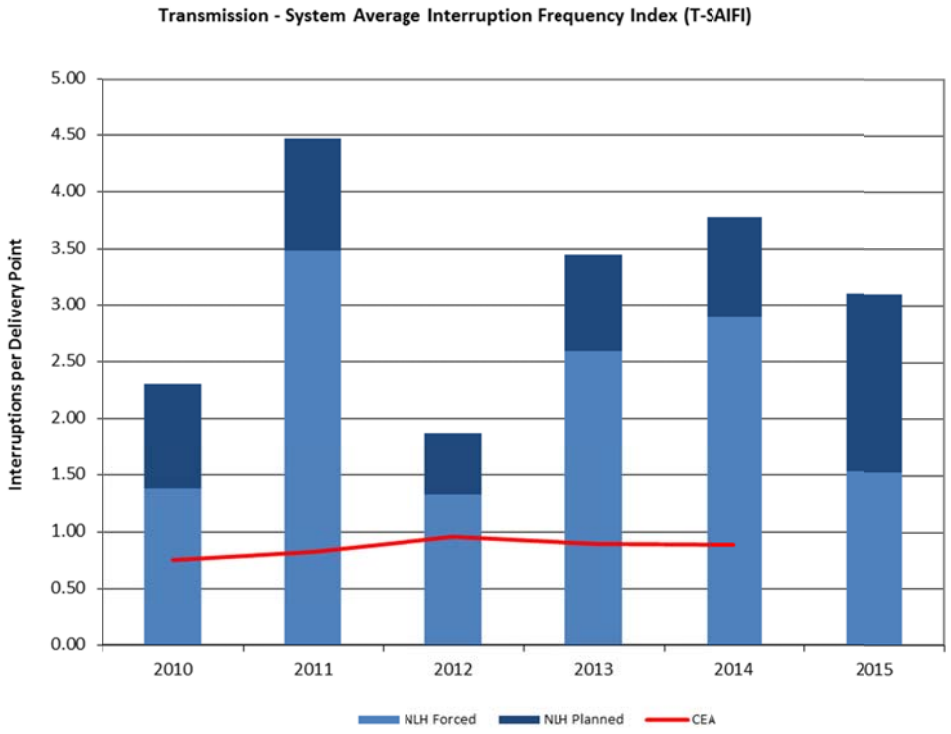
The total 2015 T-SAIDI was 476 minutes per delivery point compared to a 2014 total of 458 minutes per delivery point. There was no target set for 2015. The forced outage duration in 2015 improved considerably to 116 minutes, from 214 minutes in 2014. The planned outage duration was 361 minutes, compared to 244 minutes in 2014. The increase in the T-SAIDI for planned outages was the result of increased maintenance on terminal station equipment.



**3.1.3 b) Transmission System Average Interruption Frequency Index (T-SAIFI)** - *a reliability KPI for bulk transmission assets that measures the average number of sustained outages per delivery point*.

The fourth quarter T-SAIFI was 1.05 outages per bulk delivery point, with contributions of forced and planned outage frequency of 0.47 and 0.58, respectively. The 2014 fourth quarter T-SAIFI was 0.48 outages per bulk delivery point.

The 2015 T-SAIFI was 3.10 outages per bulk delivery point, compared to 2014 T-SAIFI of 3.78 outages per delivery point. No target was set for 2015. The number of forced outages per delivery point in 2015 improved considerably to 1.53, compared to 2.90 in 2014. The number of planned outages per delivery point in 2015 was 1.57 compared to 0.88 in 2014. The increase in the T-SAIFI for planned outages was the result of increased maintenance on terminal station equipment.

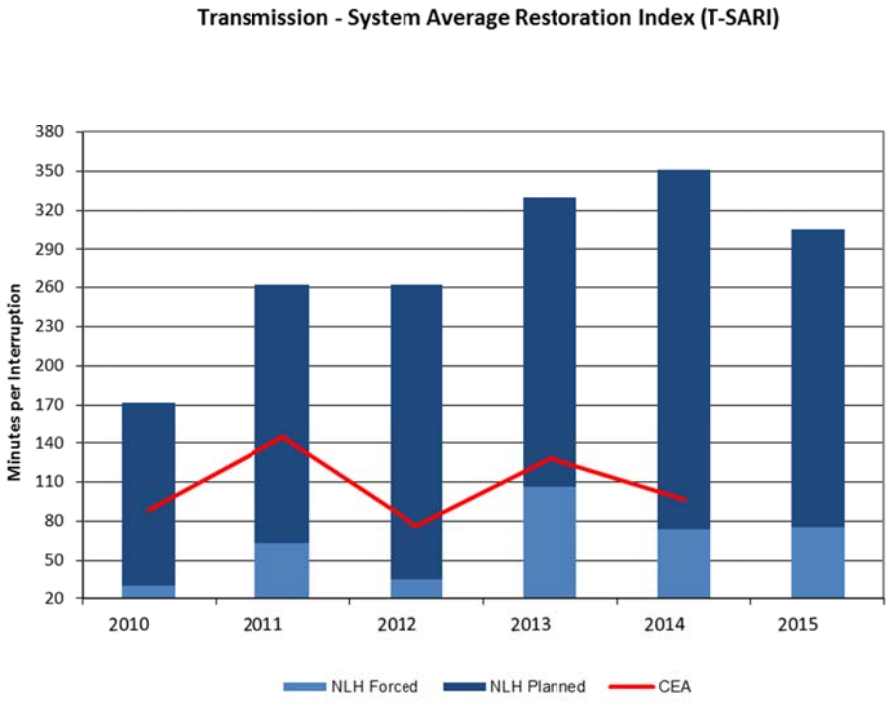


**3.1.3 c) Transmission System Average Restoration Index (T-SARI)** - *reliability KPI for bulk transmission assets which measures the average duration per transmission interruption. T-SARI is calculated by dividing T-SAIDI by T-SAIFI.*

Hydro's transmission T-SARI was 122 minutes per interruption for the fourth quarter of 2015, compared to 199 minutes per interruption during the same quarter in 2014. The forced outage component of T-SARI was 51 minutes per interruption, compared to 42 minutes per interruption in 2014. The planned outage component of T-SARI was 179 minutes per interruption compared to 286 minutes per interruption in 2014.

Hydro's overall transmission T-SARI for 2015 was 306 minutes per interruption, compared to 351 minutes in 2014. There was no target for 2015. The forced outage component of T-SARI was 76 minutes per interruption, compared to 74 minutes in 2014. The planned outage component of T-SARI was 230 minutes per interruption, compared to 277 minutes in 2014. Since T-SARI is the ratio of T-SAIDI to T-SAIFI, this increase results from the increase in T-SAIDI relative to T-SAIFI.

Hydro's total T-SARI performance improved in 2015 compared to 2014.



There were 13 forced transmission outages and 22 planned transmission outages in the fourth quarter. A summary of these outages follows:

**Forced**

On October 10, customers served by the Glenburnie, and Wiltondale Terminal Stations experienced an unplanned power outage of three hours and 56 minutes. Customers served by the Rocky Harbour Terminal Station experienced two unplanned power outages of one hour and 27 minutes and nine minutes. These outages were caused by a tree contact on transmission line TL226 during a wind storm.

On October 16, customers served by the Glenburnie, Rocky Harbour, and Wiltondale Terminal Stations experienced an unplanned power outage of 11 minutes. This outage was caused a protection operation during switching to restore TL226 after a planned outage, most likely due to a cold load pickup issue.

On October 23, customers served by the Wabush Terminal Station experienced an unplanned power outage of 49 minutes. The outage was caused by a circuit breaker controls failure during switching at the Churchill Falls Generating Station. This resulted in the tripping of the two transmission lines, L23 and L24, which supply the Wabush station.

On November 2, customers served by the Parson's Pond Terminal Station experienced an unplanned power outage of 13 minutes. This outage resulted from switching operations to close breaker B1L27 at the Cow Head Terminal Station. The bypass was closed on the breaker due to a problem with the synchronizing check relay. An attempt was made to close the breaker after salt contamination on transmission line TL227 (Daniel's Harbour to Parson's Pond) resulted in ten line recloses.

On November 2, customers served by the Cow Head Pond Terminal Station experienced an unplanned power outage of eight minutes. This outage resulted from switching operations to close breaker B1L27 at Cow Head Terminal Station. The bypass was closed on the breaker due to a problem with the synchronizing check relay. An attempt was made to close the breaker after salt contamination on transmission line TL227 (Daniel's Harbour to Parson's Pond) resulted in ten line recloses.

On November 3, customers served by the Happy Valley Terminal Station experienced an unplanned power outage of ten minutes. The outage occurred after maintenance personnel accidentally pulled an incorrect protection relay switch, causing transformers T1 and T2 to trip. Customers served by the Muskrat Falls Construction terminal station experienced an unplanned power outage of 37 minutes due a loss in the communications at site.

On November 21, customers served by the Parson's Pond Terminal Station experienced an unplanned power outage of 25 minutes. This outage resulted from switching operations which were required to safely isolate disconnect switch B1L27-2 at the Daniel's Harbour terminal station for repairs.

On December 4, customers served by the Hawke's Bay Terminal Station experienced an unplanned power outage of 16 minutes. This outage resulted when breaker B1L21 tripped due to cold load pickup during switching operations to restore the distribution system after a planned outage.

On December 10, customers served by the Grandy Brook Terminal Station experienced two unplanned power outages of one hour and 26 minutes and one hour and 30 minutes. These outages occurred after a fault during switching to restore recloser GB5-R1. This action caused the transformer T1 differential protection and T1 lockout to operate which closed the high speed disconnect switch T1AG. The fault was cleared by circuit breaker B2L14 at the Bottom Brook station. The system configuration at Bottom Brook had the circuit switcher L14L50 closed to supply both Doyles and Grandy Brooks stations. Circuit breaker B3L50 was out of service and in the process of being replaced following a failure in August 2015.

On December 10, NP customers in the Port aux Basques and the Codroy Valley areas served by the Doyles Terminal Station experienced two unplanned power outages of five minutes and four minutes. These outages occurred after circuit breaker B2L14 tripped at Bottom Waters Terminal Station. This breaker tripped during a fault that occurred during switching to restore recloser GB5-R1. This action caused the transformer T1 differential protection and T1 lockout to operate which closed the high speed disconnect switch T1AG. The system configuration at Bottom Brook had the circuit switcher L14L50 closed to supply both Doyles and Grandy Brook stations. Circuit breaker B3L50 was out of service and in the process of being replaced following a failure in August 2015.

On December 10, NP customers in the Port aux Basques and the Codroy Valley areas served by the Doyles Terminal Station experienced another unplanned power outage of 16 minutes. This outage occurred after transmission line TL214 tripped due to salt contamination.

On December 25, customers served by the Glenburnie and Wiltondale Terminal Stations experienced an unplanned power outage of two hours and two minutes and customers served by the Rocky Harbour terminal station experienced an unplanned outage of two hours and 28 minutes. These outages occurred after transmission line TL226 tripped due to a tree contact. Personnel responded and isolated the section of TL226 from the Deer Lake to Wiltondale stations. Circuit breaker L26L27 was closed at the Berry Hill station to restore customers.

On December 26, customers served by the Glenburnie, Rocky Harbour and Wiltondale Terminal Stations experienced an emergency unplanned power outage of three minutes. This outage was required to complete switching to restore Rocky Harbour line L1 following a bypass of recloser RHR-R1.

**Planned**

On October 3, customers served by the Plum Point and Bear Cove Terminal Stations experienced a planned power outage of seven hours and 32 minutes. This outage was required to complete maintenance on transmission line TL241 and transformer T1 at Plum Point station.

On October 5, customers served by the Grandy Brook Terminal Station experienced a planned power outage of three hours and 13 minutes. This outage was required to perform disconnect switch maintenance at the Bottom Brook Terminal Station.

On October 5, NP customers served by the Doyles Terminal Station experienced a planned power outage of one hour and 33 minutes. This outage was required to perform disconnect switch maintenance at the Bottom Brook Terminal Station and to complete planned work on transmission line TL214.

On October 5, customers served by the Glenburnie Terminal Station experienced a planned power outage of four hours and 50 minutes. This outage was required to complete maintenance on transmission line TL229 and transformer T1 at the Glenburnie station.

On October 15, customers served by the Grandy Brook Terminal Station experienced a planned power outage of seven hours. This outage was required to complete disconnect switch maintenance at the Bottom Brook Terminal Station.

On October 15, customers served by the Farewell Head Terminal Station experienced a planned power outage of seven hours and 26 minutes. This outage was required to safely install the mobile substation at the terminal station to facilitate planned maintenance work.

On October 15, NP customers served by the Doyles Terminal Station experienced two planned power outages of 36 minutes and 12 minutes. These outages were required to complete disconnect switch maintenance at the Bottom Brook terminal station and to complete planned work on transmission line TL214.

On October 15, customers served by the Roddickton Terminal Station experienced a planned power outage of six hours and 30 minutes. This outage was required to complete maintenance on transformer T2 at the Roddickton station. Customers served by the Main Brook Terminal Station experienced a planned power outage of four minutes during the restoration of transmission line TL257.

On October 18, customers served by feeder L11 from the Happy Valley Terminal Station experienced a planned power outage of six hours and 22 minutes. The gas turbine supplied the remainder of the town with the 138 kV transmission (L1301/L1302) supply isolated. Customers on feeder L11 experienced an outage to reduce the overall loading on the gas turbine.

On October 20, customers served by the Glenburnie, Rocky Harbour, and Wiltondale Terminal Stations experienced two planned power outages, see below for details. These outages were required for switching to isolate and restore the Rocky Harbour to Wiltondale tap section of transmission line TL226.

- Rocky Harbour Terminal Station: 15 minutes and ten minutes.
- Glenburnie Terminal Station: seven minutes and ten minutes.
- Wiltondale Terminal Station: seven minutes and ten minutes.

On October 20, customers served by the Parson's Pond Terminal Station experienced a planned power outage of 39 minutes. This outage was required to add oil to the conservator tank on transformer T1 at the station.

On October 24, customers served by the Main Brook Terminal Station experienced a planned power outage of four hours and six minutes. This outage was required to complete maintenance on transformer T1 and install AMR equipment at the station.

On October 25, NP customers served by the Western Avalon Terminal Station experienced a planned power outage of three hours and 53 minutes. This outage was required to replace and install three new PTs on the 66 kV bus in the station.

On October 25, customers served by feeder L11 from the Happy Valley Terminal Station experienced a planned power outage of five hours and 38 mins. Customers served by feeder L5 experienced a planned power outage of one hour and 50 minutes. The gas turbine supplied the remainder of the town with the 138 kV transmission (L1301/L1302) supply isolated. Customers on feeder L11 and L5 experienced an outage to reduce the overall loading on the gas turbine during the planned outage.

On November 1, customers served by the Farewell Head Terminal Station experienced a planned power outage of four hours and 56 minutes. This outage was required to safely remove the mobile substation at the terminal station after completion of transmission maintenance work.

On November 4, customers served by the Hampden and Jackson's Arm Terminal Stations experienced a planned power outage of ten minutes. This outage was required to open breaker L51T2 at Howley in order to safely close disconnect switch L53T1 at Coney Arm terminal station following station maintenance

On November 8, NP customers served by the Springdale Terminal Station experienced a planned power outage of five hours and 28 minutes. This outage was required to energize the new B1L23 breaker and to remove the temporary bypass in the terminal station.

On November 17, customers served by the Roddickton and Main Brook Terminal Stations experienced a planned power outage of four hours and ten minutes. The outages were required to perform power factor testing on transformer T1 at St. Anthony Airport terminal station. Customers in St. Anthony were supplied via the St. Anthony Diesel Plant during the transformer testing.

On November 24, Teck Resources, served by the Duck Pond Terminal Station, experienced a planned power outage of seven hours and four minutes. This outage was required to complete maintenance at the Duck Pond terminal station. During this time, Teck Resources used their back generation to supply some of their demand.

On November 25, Teck Resources, served by the Duck Pond Terminal Station, experienced another planned power outage of eight hours and 55 minutes. This outage was also required to complete maintenance at the Duck Pond terminal station. During this time, Teck Resources used their back generation to supply some of their demand.

On November 26, customers served by the Glenburnie and Wiltondale Terminal Stations experienced a planned power outage of 18 minutes. These outages were required for switching to isolate and restore the Rocky Harbour to South East Hill tap section of transmission line TL226.

On December 21, customers served by the Grandy Brook Terminal Station experienced a planned power outage of ten minutes. This outage was required to complete switching to restore circuit breaker B3L50. A new breaker was installed to replace the breaker which had failed in August 2015.

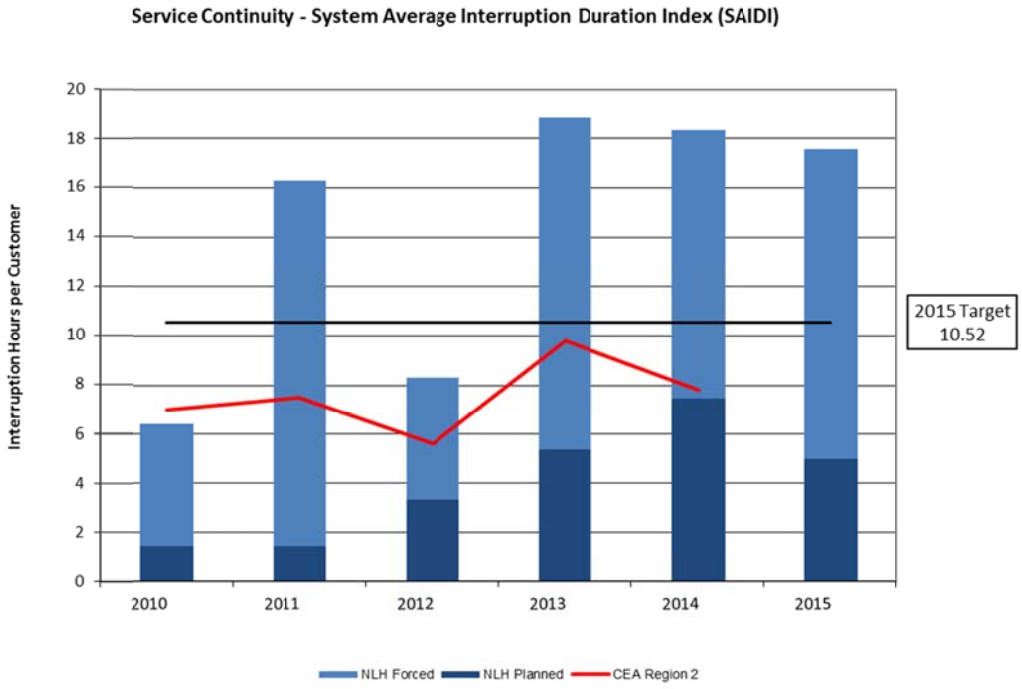
### *3.1.4 Reliability KPI: Distribution*

**3.1.4 a) System Average Interruption Duration Index (SAIDI)** - *a reliability KPI for distribution service and it measures service continuity in terms of the average cumulative duration of outages per customer served during the year.*

In the fourth quarter of 2015, SAIDI was 4.26 hours per Hydro customer, compared to 2.48 hours per customer during the same quarter of 2014.

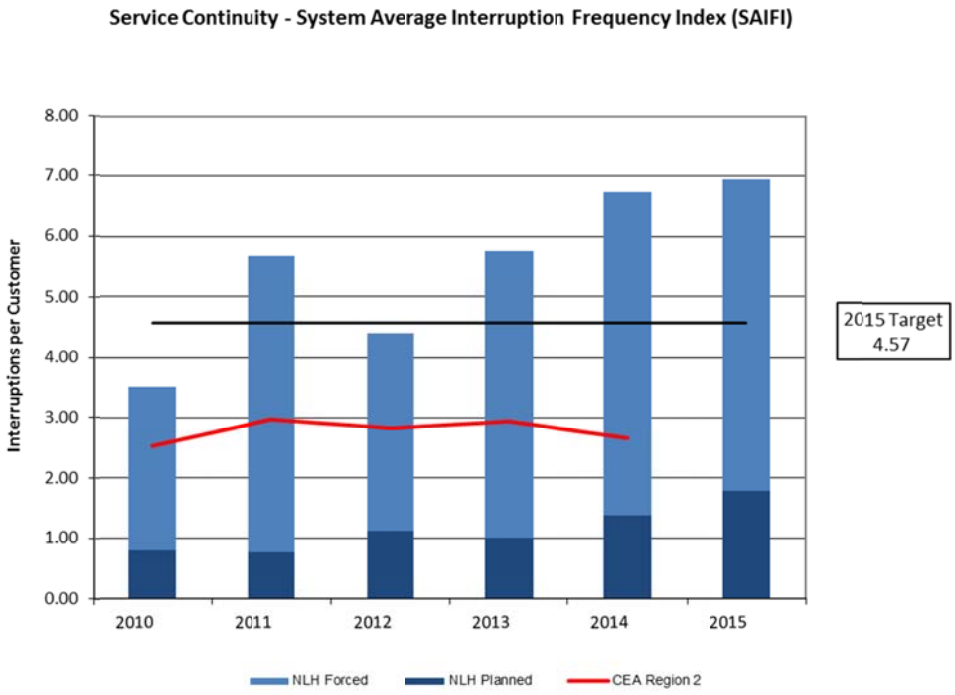
The total 2015 SAIDI was 17.54 hours per Hydro customer, compared to 18.32 hours per customer in 2014 and a target of 10.52 in 2015.

One of the main contributors to SAIDI was a series of planned outages in Labrador City and Wabush in the summer and fall of 2015. The planned outages in Labrador City were required to complete the voltage conversion project, while the Wabush planned outages were to complete upgrades at the Wabush Substation and for various distribution feeders.



**3.1.4 b) System Average Interruption Frequency Index (SAIFI)** - *reliability KPI for distribution service which measures the average cumulative number of sustained interruptions per customer per year.*

In the fourth quarter of 2015, SAIFI was 1.94, compared to 1.17 during the same quarter of 2014. The total 2015 SAIFI was 6.96, compared to 6.75 in 2014 and a target of 4.57 in 2015.




The outages during the fourth quarter resulted from a variety of causes and occurred mainly in the Labrador Interconnected region.

On October 12, 2015 at 1300 hours (Labrador time), 120 customers in Labrador City, Labrador, serviced by distribution line 3 experienced a planned power outage. The outage was required to safely perform upgrades to the distribution system. All customers were restored at 1715 hours.

On November 1, 2015 at 1530 hours (Labrador time), 729 customers in Wabush, Labrador, serviced by distribution lines 3 and 12 experienced a planned power outage. The outage was required to safely perform maintenance to the distribution system. All customers were restored at 1800 hours.

On November 7, 2015 at 1510 hours, the Muskrat Falls construction site experienced an unplanned power outage when a tree came in contact with the distribution system, causing the recloser to trip. The site was restored at 1734 hours.

On November 7, 2015 at 2330 hours, 860 customers in Happy Valley-Goose Bay, Labrador, supplied by Line 7 experienced an unplanned power outage. The outage occurred due to tree falling on a primary phase of Line 7. All customers were restored at 0220 hours, November 8, 2015.

A summary of the more significant 2015 interruptions affecting the distribution systems (i.e., outages generally to a complete system with duration of greater than five hours) are contained in Appendix C2.

### ***3.1.4 c) Additional Information***

As per Hydro's regular quarterly report, this section provides more detailed information on distribution system interruptions with performance broken down by Area, Origin, and Type.

**Rural Systems Service Continuity Performance by Area**

| SAIFI (Number per Period) | | | | | |
|---|---|---|---|---|---|
| **Area** | **Fourth Quarter** | | **12 Mths to Date** | | **5 Year** |
| | **2015** | **2014** | **2015** | **2014** | **Average** |
| **Central** | | | | | |
| Interconnected | 0.86 | 0.29 | 3.98 | 2.48 | 3.04 |
| Isolated | 0.41 | 1.04 | 2.34 | 3.63 | 3.58 |
| **Northern** | | | | | |
| Interconnected | 2.72 | 1.13 | 6.26 | 7.20 | 5.79 |
| Isolated | 2.00 | 3.89 | 9.05 | 13.74 | 8.33 |
| **Labrador** | | | | | |
| Interconnected | 2.32 | 1.01 | 10.48 | 9.76 | 8.46 |
| Isolated | 3.84 | 6.10 | 10.83 | 10.88 | 9.76 |
| Total | 1.94 | 1.17 | 6.96 | 6.75 | 5.86 |

Note: System Average Interruption Frequency Index (SAIFI) is the average number of interruptions per customer. It is calculated by dividing the number of customers that have experienced an outage by the total number of customers in an area

| SAIDI (Hours per Period) | | | | | |
|---|---|---|---|---|---|
| **Area** | **Fourth Quarter** | | **12 Mths to Date** | | **5 Year** |
| | **2015** | **2014** | **2015** | **2014** | **Average** |
| **Central** | | | | | |
| Interconnected | 3.12 | 0.71 | 12.80 | 9.21 | 12.74 |
| Isolated | 0.31 | 1.88 | 0.60 | 4.56 | 3.27 |
| **Northern** | | | | | |
| Interconnected | 5.69 | 2.64 | 13.65 | 22.48 | 16.51 |
| Isolated | 1.45 | 10.15 | 6.81 | 21.15 | 8.99 |
| **Labrador** | | | | | |
| Interconnected | 4.05 | 1.72 | 28.81 | 26.48 | 20.87 |
| Isolated | 10.92 | 11.75 | 23.39 | 14.70 | 14.38 |
| Total | 4.26 | 2.48 | 17.54 | 18.32 | 15.67 |

Note: System Average Interruption Duration Index (SAIDI) is the average interruption duration per customer. It is calculated by dividing the number of customer-outage-hours (e.g. a two-hour outage affecting 50 customers equals 100 customer-outage-hours) by the total number of customers in an area.

## Rural Systems Service Continuity Performance by Origin

**SAIFI (Number per Period)**

| Area | Fourth Quarter 2015 | Fourth Quarter 2014 | 12 Mths to Date 2015 | 12 Mths to Date 2014 | 5 Year Average |
|---|---|---|---|---|---|
| Loss of Supply – Transmission | 0.72 | 0.01 | 2.85 | 2.34 | 2.06 |
| Loss of Supply – NF Power | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 |
| Loss of Supply – Isolated | 0.08 | 0.19 | 0.39 | 0.46 | 0.47 |
| Loss of Supply – L'Anse au Loup | 0.03 | 0.03 | 0.16 | 0.24 | 0.11 |
| Distribution | 1.11 | 0.95 | 3.56 | 3.72 | 3.21 |
| Total | 1.94 | 1.17 | 6.96 | 6.75 | 5.86 |

Note: System Average Interruption Frequency Index (SAIFI) is the average number of interruptions per customer. It is calculated by dividing the number of customers that have experienced an outage by the total number of customers.

**SAIDI (Hours per Period)**

| Area | Fourth Quarter 2015 | Fourth Quarter 2014 | 12 Mths to Date 2015 | 12 Mths to Date 2014 | 5 Year Average |
|---|---|---|---|---|---|
| Loss of Supply – Transmission | 1.93 | 0.04 | 9.29 | 4.21 | 5.06 |
| Loss of Supply – NF Power | 0.00 | 0.00 | 0.04 | 0.00 | 0.11 |
| Loss of Supply – Isolated | 0.03 | 0.15 | 0.25 | 0.26 | 0.23 |
| Loss of Supply – L'Anse au Loup | 0.03 | 0.01 | 0.14 | 0.20 | 0.09 |
| Distribution | 2.27 | 2.28 | 7.82 | 13.64 | 10.17 |
| Total | 4.26 | 2.48 | 17.54 | 18.32 | 15.67 |

Note: System Average Interruption Duration Index (SAIDI) is the average interruption duration per customer. It is calculated by dividing the number of customer-outage-hours (e.g. a two-hour outage affecting 50 customers equals 100 customer-outage-hours) by the total number of customers in an area.

## Rural Systems Service Continuity Performance by Type – 2015 Fourth Quarter Only

| Area | Scheduled | | Unscheduled | | Total | |
|---|---|---|---|---|---|---|
| | SAIFI | SAIDI | SAIFI | SAIDI | SAIFI | SAIDI |
| **Central** | | | | | | |
| Interconnected | 0.08 | 0.12 | 0.78 | 3.00 | 0.86 | 3.12 |
| Isolated | 0.00 | 0.00 | 0.41 | 0.31 | 0.41 | 0.31 |
| **Northern** | | | | | | |
| Interconnected | 0.79 | 0.93 | 1.93 | 4.77 | 2.72 | 5.69 |
| Isolated | 0.32 | 0.48 | 1.68 | 0.97 | 2.00 | 1.45 |
| **Labrador** | | | | | | |
| Interconnected | 0.54 | 1.67 | 1.78 | 2.37 | 2.32 | 4.05 |
| Isolated | 2.51 | 10.08 | 1.33 | 0.84 | 3.84 | 10.92 |
| Total | 0.52 | 1.25 | 1.42 | 3.02 | 1.94 | 4.26 |

Note:

1. System Average Interruption Frequency Index (SAIFI) is the average number of interruptions per customer. It is calculated by dividing the number of customers that have experienced an outage by the total number of customers in an area.

2. System Average Interruption Duration Index (SAIDI) is the average interruption duration per customer. It is calculated by dividing the number of customer-outage-hours (e.g. a two-hour outage affecting 50 customers equals 100 customer-outage-hours) by the total number of customers in an area.

### *3.1.5 Reliability KPI: Other*

**3.1.5 a) Under Frequency Load Shedding (UFLS)** - *reliability KPI that measures the number of events in which shedding of a customer load is required to counteract a generator trip. Customer loads are shed automatically depending upon the generation lost.*

There were three underfrequency events during the fourth quarter of 2015, summarized as follows:

On October 1, 2015, at 2208 hours, Holyrood Unit #3 tripped. With the removal of generation (approximately 22 MW) the system frequency dropped to 58.7 Hz resulting in the activation of the under frequency protection at NP (4,655 customers) and Corner Brook Pulp and Paper Limited (one Industrial Customer). Total Island load at the time of the incident was 708 MW. Hydro advised NP they could restore load within two minutes after the event occurring (NP reported all customers restored within four minutes). Hydro advised Corner Brook Pulp and Paper they could restore load within four minutes after the event occurred.

| | |
|---|---|
| Load Shed: | |
| Newfoundland Power: | 7 MW |
| Corner Brook Pulp and Paper: | 15 MW |
| Total Load Shed: | 22 MW |

The unit tripped while performing a weekly backwash on the Unit 3 condenser to remove natural biofouling. Both cooling water inlet valves were inadvertently closed at the same time due to an operator procedural error. This interrupted cooling water flow and normal condenser operation. Holyrood control room operations staff recognized the abnormal condenser operation, initiated off-loading and manually tripped the unit as appropriate for the situation. **(Unsupplied Energy: 74 MW-Mins)**

On November 15, 2015, at 0046 hours, Holyrood Unit #1 tripped. With the removal of generation (approximately 60.1 MW) the system frequency dropped to 58.7 Hz resulting in the activation of the under frequency protection at NP (5,437 customers). Total Island load at the time of the incident was 783 MW. NP reported all customers restored within three minutes.

Total Load Shed: 12.4 MW

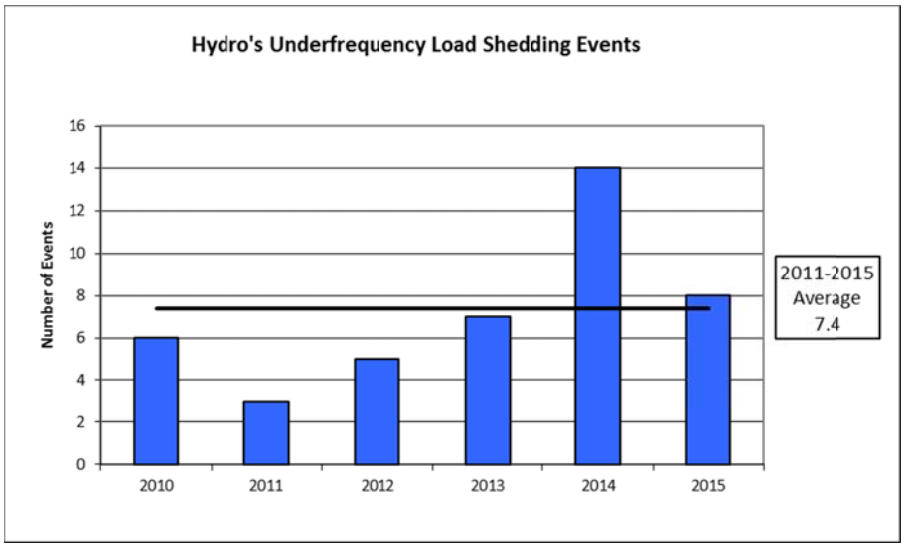
Hydro's investigation has determined that the cause of the trip was an issue with the Mark V governor control system. These issues were repaired after another trip on November 27. **(Unsupplied Energy: 37 MW-Mins)**

On November 27, 2015 at 1033 hours, Holyrood Unit #1 tripped. With the removal of generation (approximately 100 MW) the system frequency dropped to 58.34 Hz resulting in the activation of the under frequency protection at NP (17,582 customers). Total Island load at the time of the incident was 1115 MW. Hydro advised NP they could restore load within seven minutes after the event occurring, NP reported most customers (all but one feeder) were restored within ten minutes and all customers restored within 14 minutes. The delay in restoring the final feeder was due to hold offs on that line. Hydro advised Corner Brook Pulp and Paper they could restore its load within 15 minutes after the event occurred. Hydro customers were restored within ten minutes.

| | |
|---|---|
| Load Shed: | |
| Newfoundland Power: | 78 MW |
| NLH: | 3 MW |
| Corner Brook Pulp and Paper: | 15 MW |
| Total Load Shed: | 96 MW |

Hydro's investigation determined that the cause of the trip was an issue with the Mark V governor control system. Hydro has worked with the OEM and replaced hardware which was suspected to be the cause of the issue. **(Unsupplied Energy: 1,035 MW-Mins)**

In total, there were eight UFLS events in 2015, compared to 14 in 2014 and the five-year average (2011-2015) of 7.4 events. Refer to the graph below which compares the UFLS events over the past five years to this year's performance.




The following table compares the UFLS events in the fourth quarter of 2015 to the same quarter in 2014 in addition to the annual performance.

**Underfrequency Load Shedding Number of Events**

| Customers | Fourth Quarter | | Year to Date | | 5 Year Average |
|---|---|---|---|---|---|
| | 2015 | 2014 | 2015 | 2014 | (2011–2015) |
| NF Power | 3 | 4 | 8 | 14 | 7.4 |
| Industrials | 2 | 1 | 6 | 3 | 2.0 |
| Hydro Rural* | 1 | 1 | 2 | 2 | 2.0 |
| Total Events | 3 | 4 | 8 | 14 | 7.4 |

**Underfrequency Load Shedding Unsupplied Energy (MW-min)**

| Customers | Fourth Quarter | | Year to Date | | 5 Year Average |
|---|---|---|---|---|---|
| | 2015 | 2014 | 2015 | 2014 | (2011–2015) |
| NF Power | 831 | 1,722 | 2,245 | 5,798 | 5,096 |
| Industrials | 285 | 70 | 660 | 200 | 200 |
| Hydro Rural* | 30 | 12 | 72 | 48 | 110 |
| Total Events | 1,146 | 1,804 | 2,977 | 6,046 | 5,406 |

* Underfrequency activity affecting Hydro Rural Customers may also result in a number of delivery point outages. Outage frequency and duration are also included in totals shown in the delivery point statistics section of the report for these areas, namely the Connaigre Peninsula and Bonne Bay.

The details of the previous five UFLS events in 2015 are summarized in Appendix C3. Refer to Appendix C4 for Other Significant Transmission System Disturbances.

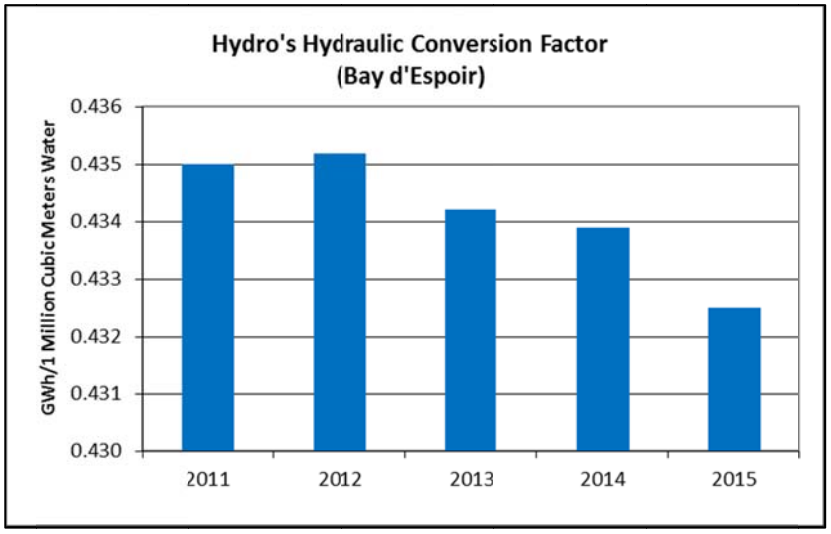
## *3.2 Operating Performance Indicators*

This section presents information on two indicators of operating performance, both of which are associated with generation.

### *3.2.1 Operating KPI: Generation*

**3.2.1 a) Hydraulic Conversion Factor (Bay d'Espoir)** - *a representative performance KPI for the principal hydroelectric generation assets located at Bay d'Espoir. This KPI tracks the efficiency in converting water to energy and it is calculated as the ratio of Net GWh generated for every one million cubic metres (MCM) of water consumed.*

In 2015, the hydraulic conversion factor for Bay d'Espoir was 0.4325 GWh/MCM, compared to a 2015 target of 0.433 GWh/MCM.




In 2015, the water levels were lower in the reservoirs allowing for improved water utilization at the Bay d'Espoir plant. This resulted in a lower conversion factor than previous years.

**3.2.1 b) Thermal Conversion Factor -** *a representative performance KPI for the oil-fired thermal generation assets located at Holyrood. This KPI tracks the efficiency in converting heavy fuel oil into electrical energy and is measured as the ratio of the net kWhs generated to the number of barrels of No. 6 fuel oil consumed.*

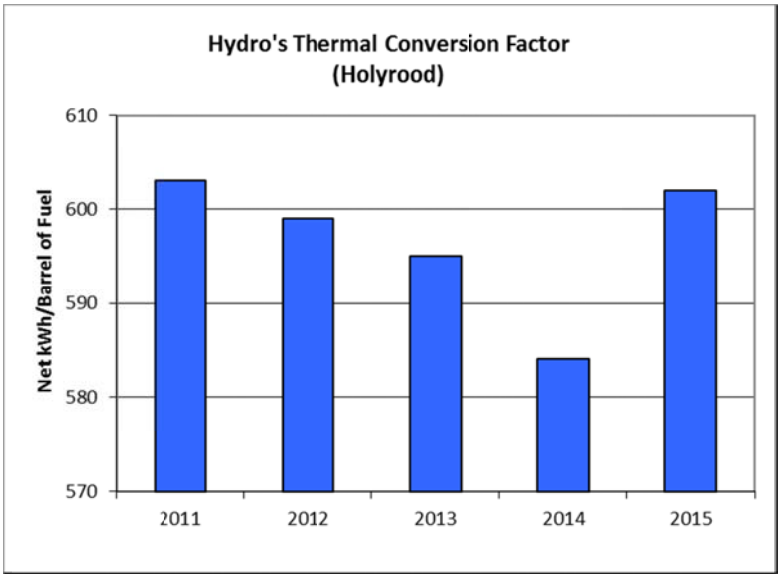
The thermal conversion factor for Holyrood is proportional to the output level of the three units, with higher averages and sustained loadings resulting in higher conversion factors. The output level of the Holyrood Thermal Generating Station will vary depending on hydraulic production on the Island, quantity of power purchases, customer energy requirements and system security requirements. The thermal conversion factor is also impacted by the heating content in the No. 6 fuel consumed at the plant, measured in BTUs/bbl.

In 2015, Hydro's net thermal conversion factor was 602 kWh per barrel compared to 584 kWh per barrel in 2014 and the 2015 target of 607 kWh per barrel. The lower energy conversion rate in 2015, relative to the target, results from a lower average unit loading and a lower heating content in the No. 6 fuel consumed at the Holyrood generating station.

The efficiency at the Holyrood plant has remained relatively consistent with a net heat rate performance of 10,468 BTU/kWh in 2015 compared to 10,779 BTU/kWh in 2014.

In 2015, the units were dispatched as required for Avalon transmission support and system peak load considerations. The average net unit load, while operating, was 88.9 MW, up from 83.2 MW in 2014, but lower than the budget of 109.6 MW for 2015.

Overall, net production from Holyrood for 2015 was 1,458 GWh, an 11% increase from 2014 production levels. The production increase in 2015 relative to 2014 was primarily due to increased Avalon transmission support requirements through the winter and early spring period and overall higher customer demand requirements on the system.



## *3.3 Financial Performance Indicators*

The financial KPIs reported annually to the Board are:

1. Corporate operating, maintenance and administrative expense (OM&A) per MWh delivered;
2. Generation OM&A per MW installed capacity;
3. Generation OM&A per GWh generated;
4. Transmission OM&A per transmission circuit km; and
5. Distribution OM&A per distribution circuit km.[6]

In Order No. P.U. 8(2007), the Board ordered that Hydro file a report no later than October 31, 2007 outlining an appropriate peer group with which Hydro's financial performance at the generation and transmission levels could be compared. In compliance with Board Order No. P.U. 8(2007), Hydro filed a report titled "Peer Group Benchmarking" dated October 31, 2007 which summarized Hydro's findings regarding development of a peer group for financial KPIs related to generation and transmission. In that report, Hydro identified separate peer groups for generation KPIs and transmission KPIs and proposed that, subject to data availability, the selected peers remain constant to allow for meaningful trend comparisons over time. This is the eighth year of reporting generation and transmission financial KPI peer data. The list of peers used for KPI benchmarking for Financial Performance Indicators is included as Appendix D. This peer group benchmarking data is sourced from the U.S. Federal Energy Regulatory Commission (FERC) database, to which Hydro has a subscription. All financial data for the U.S.-based peer group is in $US and all financial data for Hydro is in $Cdn.

With respect to the Corporate and Distribution KPIs (items 1 and 5 above), in its 2007 Annual Report on KPIs Hydro had incorporated peer benchmarking data from the Canadian Electricity Association's (CEA) Committee on Performance Excellence (COPE), as published in the "Peer Group Performance Measures for Newfoundland Power" report. However, the CEA has informed Newfoundland Power that the composite information for these measures is no longer available, nor are any other cost-related CEA composite indicators available for benchmarking purposes.[7] As a result, Newfoundland Power is now using a peer group of U.S. companies. This group of US companies is not an appropriate group for Hydro due to Hydro's relatively small distribution component. In order to maintain consistency for year-over-year comparisons, Hydro is using the same peer group of U.S. companies for the Corporate Controllable Unit Cost KPI that Hydro uses for its generation financial benchmarking.

[6] This KPI is not available for benchmarking from 2007 onwards. It will continue to be reported for Hydro for annual comparison purposes. Please see section 3.3.4 a) Distribution Controllable Cost for a discussion of the alternate KPI to be used for peer benchmarking.

[7] "Peer Group Performance Measures for Newfoundland Power", December 23, 2008, p.2.

### 3.3.1 Financial KPI: Corporate Operating, Maintenance and Administrative Expense (OM&A) per MWh delivered

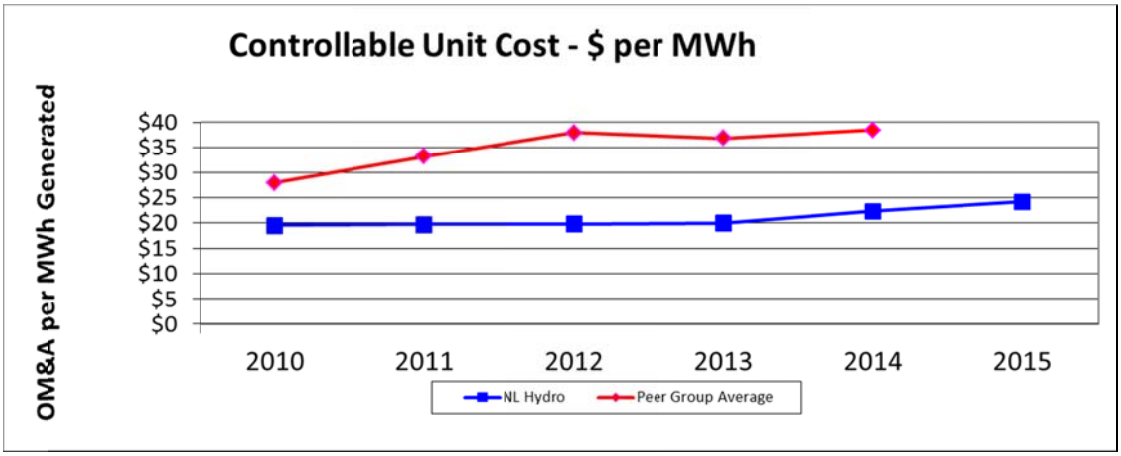
**3.3.1 Controllable Unit Cost** - *a high level corporate KPI that tracks Hydro's OM&A expenses in relation to its total energy delivered, expressed as dollars per MW hour. Total Corporate OM&A includes all operating labour and materials for Hydro's generation, transmission, distribution, customer-related and administrative costs, and loss on disposal of capital assets. Energy deliveries have been normalized for weather, customer hydrology, and industrial strikes.*

Hydro's OM&A costs increased from $134.2 million in 2014 to $153.8 million in 2015, resulting in a Controllable Unit Cost of $16.71 per MWh delivered for 2015.

Up to 2006, Hydro's Controllable Unit Cost was compared to the average Controllable Unit Cost for participants in the CEA COPE program as reported by Newfoundland Power. As of 2008, however, Newfoundland Power no longer uses CEA COPE benchmarking data for cost-related measures, because the composite information for these measures is no longer available for publication. Peer group results for the period 2007-2014 have therefore been restated using the same U.S. Peer Group that Hydro uses for generation financial KPIs.

For computation of Hydro's Corporate Controllable Unit Cost, normalized energy delivered is used. However, the available peer group data from the FERC database is based on net energy generated. Thus, for better comparison against the peer group, Hydro's data will also be calculated and charted on this basis. Hydro's Corporate OM&A per unit of net generation was $24.13 per MWh during 2015, higher than the computed Controllable Unit Cost, because normalized deliveries are higher than net generation due to the effect of Hydro's energy purchases.

Hydro's Corporate Controllable Unit Cost is following a very steady trend as compared to an upward trend from 2009 to 2012 and 2014, with a slight decline in 2013 for the peer group. However, it is difficult to determine specifically what factors might be impacting the expenses of the peer group participants without detailed information regarding their operations and finances.

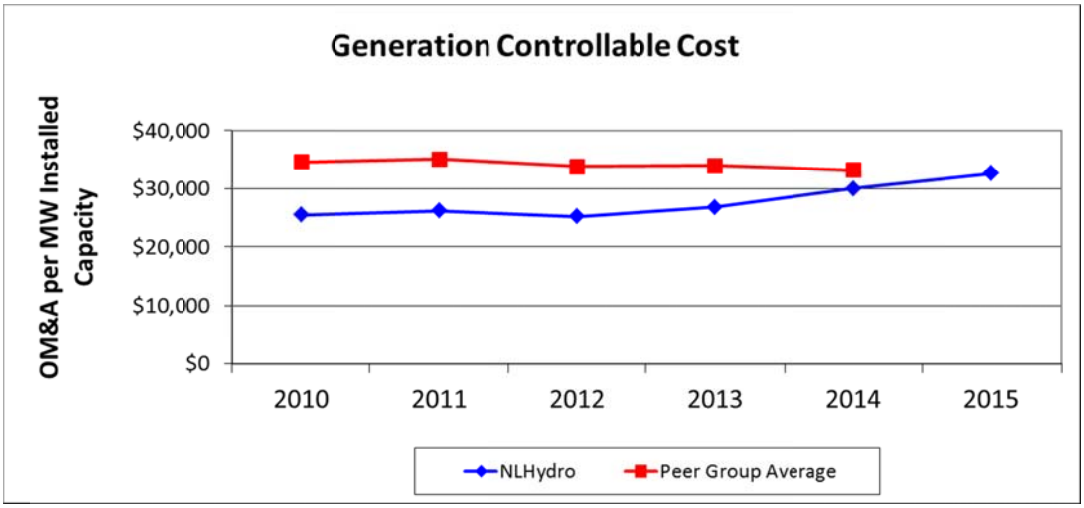


### 3.3.2 Financial KPI: Generation OM&A per MW Installed Capacity

**3.3.2 Generation Controllable Cost** - *a functional corporate KPI that tracks Hydro's generation costs in relation to its installed generation. It is computed by dividing generation OM&A by installed capacity as measured in MW.*

Generation Controllable Cost was $32,599 per MW for 2015 compared with $30,013 in 2014 an increase of $2,586 per MW.

The peer group used to benchmark Generation Controllable Costs appears to be experiencing a relatively steady trend in 2012 to 2014 OM&A per MW installed capacity while Hydro is showing increases for the period 2012 to 2015.

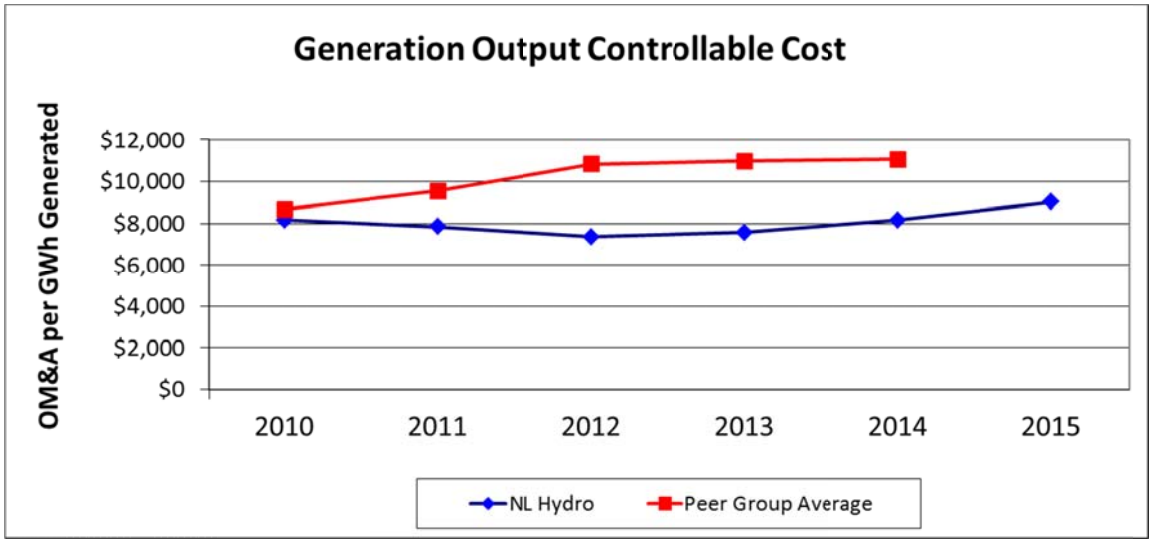



### 3.3.3 Generation OM&A per GWh generated

**3.3.3 Generation Output Controllable Cost** - *a functional corporate KPI that tracks Hydro's generation OM&A expenses in relation to its net generation measured in GWh.*

In 2015, Hydro's Generation Output Controllable Cost of $9,010 per GWh, was higher than the $8,150 in 2014. There was an increase in the Generation Costs component of approximately $8.3 million from 2014 to 2015 coupled with an increase of 347 GWh in the Net Energy Generated.

In 2010, Hydro's Generation Output Controllable Costs were primarily in line with those of the peer group with declines showing for Hydro from 2011 and 2012 and moderate increases recorded from 2013 through 2015.

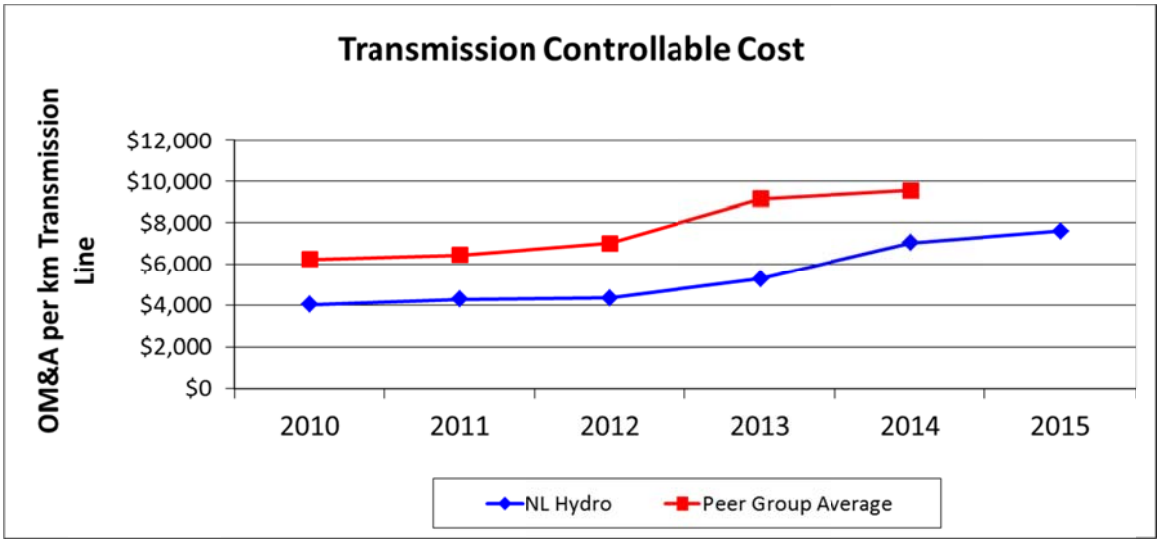



### 3.3.4 Financial KPI: Transmission OM&A per Transmission Circuit km

**3.3.4 Transmission Controllable Cost** - *a KPI that tracks Hydro's transmission OM&A expenses in relation to the 230 kV equivalent length of its transmission circuits (69 kV lines and above).*

In 2015, Hydro's Transmission Controllable Cost was $7,615 per km of transmission, an increase of 8.1% over 2014.

Hydro's costs per km of transmission circuit are trending in a similar pattern as the peer group, although per unit cost increases appear to be increasing at a slower rate within Hydro for the period 2010 to 2013. A direct cost per unit km within the peer group is not meaningful due to differences in accounting and corporate cost allocations; however comparisons over time can highlight relevant trends.



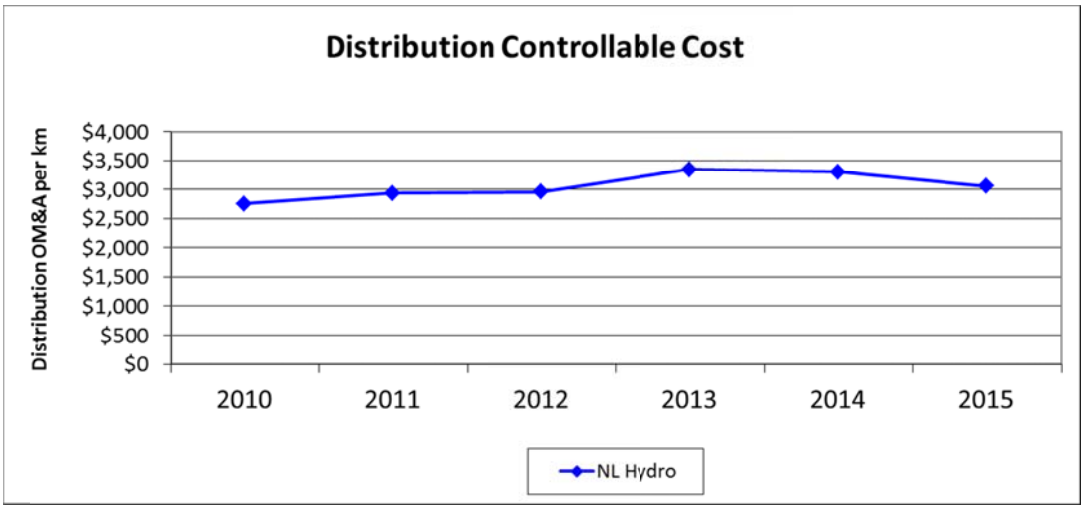
### 3.3.5 Financial KPI: Distribution OM&A per Distribution Circuit km

**3.3.5 Distribution Controllable Cost** - *a functional corporate KPI that tracks Hydro's distribution OM&A expenses in relation to the length of its equivalent 230 kV distribution circuits in kilometres*[8].

The Distribution Controllable Cost KPI had previously been reported as dollars per km of distribution using the CEA COPE data. As discussed, the CEA COPE data is no longer available for benchmarking of financial KPIs. Additionally, although distribution cost data is available for the U.S.-based peer group used by Hydro for Transmission Controllable Cost, the associated km of distribution data is unavailable. In the absence of the CEA COPE data, Newfoundland Power has chosen to use a KPI that divides total Distribution OM&A by MWh of retail sales. Hydro will therefore use this same data set. However, given Hydro's relatively small quantity of retail sales, combined with the rural and remote locations of these sales, it is expected that Hydro's Distribution cost per MWh will be significantly higher than Newfoundland Power's and the peer group average.

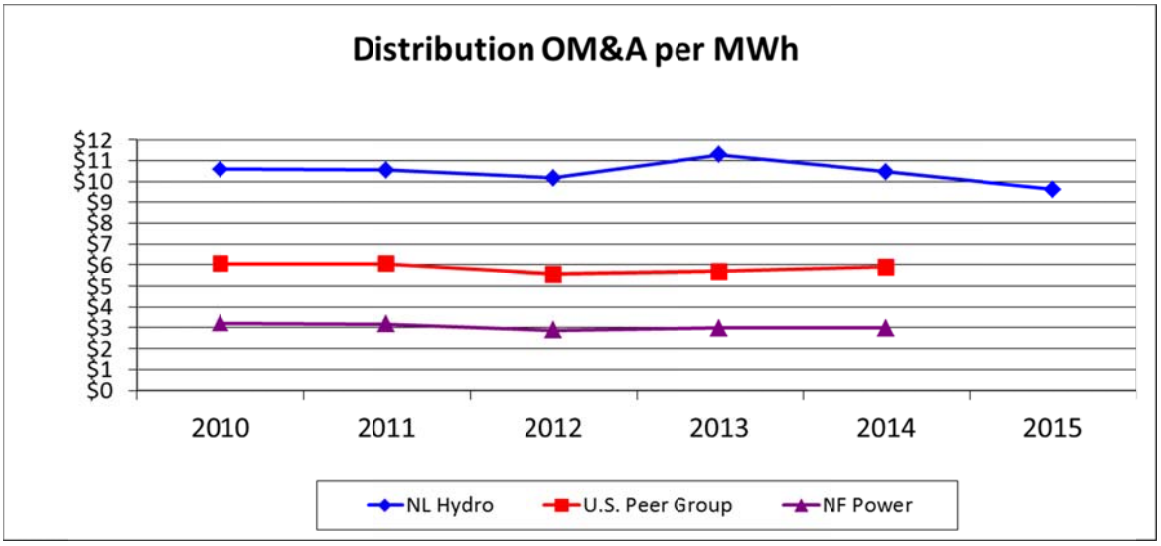
The distribution cost per km of circuit length will continue to be reported for year-over-year trend analysis.

At $3,053 per circuit km Hydro's Distribution Controllable Cost of 2015 decreased from the $3,304 that was recorded in 2014. This is a downward trend in this cost in 2015 compared to the increase trend that was seen between 2010 and 2013.




As expected, Hydro's distribution costs of $10.45 per MWh in 2014 trend higher than those of its peers in the table below. The distribution systems are a relatively small component of Hydro's total plant compared to generation and transmission plant and also compared to Newfoundland Power's distribution assets. Thus, Hydro's higher costs per MWh are likely due to the rural and geographically dispersed nature of its distribution systems and the resultant inability to achieve cost economies.

[8] CEA COPE peer data used up to 2007 excluded circuits less than 1 kV. Hydro's data has also been adjusted to exclude circuits less than 1 kV from 2003 onward.




## *3.4 Customer-Related Performance Indicators*

**3.4.1 a) Residential Customer Satisfaction** - *an indicator of Hydro's residential customers overall satisfaction level with service, which is tracked by the Percent Satisfied Customers KPI*[9]*.*

*The Percent Satisfied Customers measure is also a corporate performance KPI that tracks the satisfaction of rural residential customers with Hydro's performance. The Percent Satisfied Customers measure is produced via an annual survey of Hydro's residential customers.*

The 2014[10] residential customer satisfaction survey shows that 84% of customers are either very satisfied or somewhat satisfied with Hydro. When compared to 2012, customer satisfaction has increased by 4%.

[9] As of 2009, the Customer Satisfaction index (CSI) is no longer being calculated as a Customer-Related Performance Indicator.
[10] The next customer satisfaction survey is planned for Q2 2016.

Residential Customer Satisfaction
Overall Customer Satisfaction
94
92
90
88
86
84
82
80
78
76
74
2008
2009
2010
2011
2012
2014

# *Appendices*

# Appendix A: Rationale for Hydro's 2015 KPI Targets

| KPI | Comment on KPI 2015 Target |
|---|---|
| Reliability | Hydro has adopted a target setting approach wherein known factors that affect reliability performance are incorporated into the target setting process wherever practical. This approach also uses percentage improvements and past performance levels to set target levels for continuous improvements. |
| Weighted Capability Factor | The 2015 target is set using the expected annual generation unit outage schedule combined with performance improvements relative to recent history. |
| Weighted DAFOR | The 2015 target is set using the expected annual generation unit outage schedule combined with performance improvements relative to recent history. |
| Transmission SAIDI, SAIFI, and SARI | The 2015 targets for forced outage performance were not set. |
| Distribution SAIDI & SAIFI | Improvements relative to the most recent five-year average. |
| Underfrequency Load Shedding | The 2015 target is based upon improvement over the most recent five-year average. |
| **Operating** | |
| Hydraulic Conversion Factor | Hold at the previous target value. |
| Thermal Conversion Factor | The 2015 target is based on November 2014 budget for 2015 Holyrood plant operation. |
| **Other** | |
| Customer Satisfaction | Targeting continuous improvement. |

# Appendix B: Computation of Weighted Capability Factor and Factors Impacting Performance

Weighted Capability Factor is calculated using the following formula:

$$1 - \frac{\sum_{all\ units}\left(\frac{unit\ total\ equivalent\ outage\ time \times unit\ MCR}{unit\ hours}\right)}{\sum_{all\ units} unit\ MCR}$$

Where,

**MCR** = Maximum Continuous Rating, the gross maximum electrical output, measured in megawatts, for which a generating unit has been designed and/or has been shown capable of producing continuously. MCR would only change if the generating capability of a unit is permanently altered by virtue of equipment age, regulation, or capital modifications. Such changes to MCR are infrequent and have not actually taken place within Hydro since the 1980's when two units at Holyrood were uprated due to modifications made to these units.

**Unit hours** = the sum of hours that a unit is in commercial service. This measure includes time that a unit is operating, shut down, on maintenance, or operating under some form of derating. Unit hours will only be altered in the infrequent event that a unit is removed from commercial service for an extended period of time.

**Unit total equivalent outage time** = the period of time a unit is wholly or partially unavailable to generate at its MCR. For the purposes of calculating outage time, the degree to which a unit is derated is converted to an outage equivalency. Thus, a unit that is able to generate at 75% load for four days would have an equivalent outage time of one full day out of four. Factors that can affect unit total equivalent outage time are classified by CEA under nine categories, which are outlined in Appendix A to this Report. Hydro tracks the time that each unit spends in each of these nine states and calculates the weighted capability accordingly.

Unit total equivalent outage time is the measure that is most likely to impact Weighted Capability Factor on a year-to-year basis, since MCR and unit hours are unlikely to change.

# Appendix B: Computation of Weighted Capability Factor and Factors Impacting Performance (Cont'd)

**Factors that Affect Unit Total Equivalent Outage Time**

1. **Sudden Forced Outage.** An occurrence wherein a unit trips or becomes immediately unavailable.
2. **Immediately Deferrable Forced Outage**. An occurrence wherein a unit must be made unavailable within a very short time (ten minutes).
3. **Deferrable Forced Outage**. An occurrence or condition wherein a unit must be made unavailable within the next week.
4. **Starting Failure**. A condition wherein a unit is unable to start.
5. **Planned Outage**. A condition where a unit is unavailable because it is on its annual inspection and maintenance.
6. **Maintenance Outage**. A condition where a unit is unavailable due to repair work. Maintenance outage time covers outages that can be deferred longer than a week, but cannot wait until the next annual planned maintenance period.
7. **Forced Derating**. A condition that limits the usable capacity of a unit to something less than MCR. The derating is forced in nature, typically because of the breakdown of a subsystem on the unit.
8. **Scheduled Derating**. A condition that limits the usable capacity of a unit to something less than MCR, but is done by virtue of the decision of the unit operator. Scheduled deratings are less common than forced deratings, but can arise, for example, when a unit at Holyrood is derated to remove a pump from service.
9. **Common Mode Outages**. Common mode outages are rare, and arise when an event causes multiple units to become unavailable. An example might be the operation of multiple circuit breakers in a switchyard at Holyrood due to a lightning strike, rendering up to three units unavailable.

Note: There are hundreds of CEA equipment codes for generator subsystems that track the cause for the time spent in each of the above categories.

## Appendix C1: Significant Transmission Events – 2015

There were nine significant events in 2015. The details follow:

### Event 1

On January 27, customers served by the Wiltondale, Glenburnie, and Rocky Harbour Terminal Stations experienced an unplanned power outage of two hours and 56 minutes. This was an emergency outage to make repairs to a broken crossarm on structure #273 and to re-attach a floating phase on transmission line TL226. The line had been damaged during the winter storm on January 25. The damage was detected during a line patrol of TL226 on January 27.
**(Unsupplied Energy: 1,091 MW-Mins)**

### Event 2

On February 1, Hydro and NP customers served by the Bottom Waters Terminal Station experienced an unplanned power outage of three hours and 16 minutes. The outage occurred after transmission line 363L tripped during a winter storm due to icing on the structures crossarms. Customer restoration was delayed due a 'stuck' control relay in the auto synch circuit. This circuit controls breaker B1L363 closure at Indian River Terminal Station.
(**Unsupplied Energy: 2,193 MW-Mins)**

### Event 3

On February 3, customers served by the Grandy Brook Terminal Station experienced an unplanned power outage of ten hours. The outage occurred after TL250 tripped during a winter storm due to a broken crossarm. Customer restoration was delayed due to the Burgeo Highway being closed due to poor weather conditions. The Department of Highways reopened the highway and cleared a path which allowed for a crew to perform a line patrol. The broken crossarm was located but due to the high winds (100 km/h) the crew had to wait for the wind speeds to lower before the crossarm could be replaced.
(**Unsupplied Energy: 2,040 MW-Mins)**

### Event 4

On February 15, NP customers served by the Bay L'Argent Terminal Station experienced an unplanned power outage of four hours and 43 minutes, while NP customers served by the Monkstown Terminal Station experienced an unplanned power outage of six hours and 54 minutes. The outages occurred after TL212 tripped due to a burnt off jumper on disconnect switch L12-2 at Monkstown Terminal Station. **(Unsupplied Energy: 2,102 MW-Mins)**

## Appendix C1: Significant Transmission Events – 2015 (Cont'd)

### Event 5

On June 27, customers served by the Happy Valley and Muskrat Falls Terminal Stations experienced an unplanned power outage of two hours and 52 minutes. The outage occurred when a lighting strike hit transmission line L1301. The outage was extended due to problems with restoration of the 138 kV bus at Churchill Falls. (**Unsupplied Energy: 3,148 MW-Mins)**

### Event 6/Event 7

On July 2, customers served by the Happy Valley and Muskrat Falls Terminal Stations experienced two unplanned power outages of one hour and 53 minutes and one hour and 16 minutes. The outages occurred when a lightning strike hit transmission line L1301. The outages were extended due to issues with restoration of the 138 kV bus at Churchill Falls.

Event 6: (**Unsupplied Energy: 2,091 MW-Mins)**
Event 7: (**Unsupplied Energy: 1,186 MW-Mins)**

### Event 8

On September 8, NP customers served by the Western Avalon Terminal Station experienced an unplanned power outage of four hours and 55 minutes. This outage occurred after the failure of a PT on Bus B2 at Western Avalon Terminal Station. Three new PTs were installed on a planned outage in October. (**Unsupplied Energy: 1,092 MW-Mins)**

### Event 9

On October 23, customers served by the Wabush Terminal Station experienced an unplanned power outage of 49 minutes. The outage was caused by a circuit breaker controls failure during switching at the Churchill Falls Generating Station. This resulted in the tripping of the two transmission lines, L23 and L24, which supply the Wabush station. (**Unsupplied Energy: 10,474 MW-Mins)**

# Appendix C2: Significant Distribution Events – 2015 (Excluding Fourth Quarter)

At 1946 hours, January 4, 2015, there was a trip and reclose to Grandy Brook Terminal Station recloser, GB5-R1. Up to 120 customers in the communities of La Poile and Grand Bruit experienced the initial power interruption. Following the reclose, 66 customers in the Community of La Poile continued to experience a power outage. A Hydro crew was dispatched to the Grandy Brook Terminal Station and confirmed the correct operation of GB5-R1, however adverse weather conditions prevented travel to La Poile until later in the week. On January 7, 2015, a Hydro crew was able to fly to site and make repairs. A floating neutral conductor had made contact with the primary conductor in the distribution line. All customers were restored at 1200 hours, January 7, 2015.

At approximately 1100 hours, January 9, 2015, all customers (66) in the community of La Poile began to experience an unplanned power outage. Hydro sent a crew via helicopter on that day; however the helicopter was unable to land in La Poile due to windy weather conditions. A Hydro crew was able to fly to La Poile during the morning of January 10, 2015. Hydro had initially suspected that the sectionalizer (GB5-S2) supplying the town may have been the cause of the outage, therefore this was bypassed and the line re-energized. All customers were restored at 1146 hours, January 10, 2015. The crew continued to patrol the lines to check for additional equipment damage. During this patrol a single phase recloser (GB5-R2) was found to be making abnormal noises and this recloser was bypassed. Hydro believes this to be the root cause of the outage. Recloser GB5-R2 remains bypassed until the unit can be inspected. With sectionalizer (GB5-S2) bypassed, any future issues in La Poile will cause a recloser to trip at Hydro's Grandy Brook Terminal Station, however this station is more easily accessible for customer restoration.

On January 9, 2015 at 1422 hours, all Hydro customers (998) serviced by the L'Anse au Loup Substation experienced an unplanned power outage. The outage occurred when the supply from Hydro Québec (HQ) was interrupted due to a transformer lockout of the HQ T1 transformer. Hydro Québec switched supply to HQ T2 transformer, however not all load could be restored at once as the load was too high for the transformer. The L'Anse au Loup diesel plant was started and all customers were restored at 1507 hours. Due to the lower capacity of transformer HQ T2, Hydro has agreed that it will co-generate, using the L'Anse au Loup diesel plant, during system peak times or at the request of Hydro Québec. Hydro Québec reported the outage was caused by low gas in a breaker. It was repaired and all equipment was put back in service on February 04, 2015.

On February 16, 2015 at 1640 hours, all customers (170) in Rigolet, Labrador experienced an unplanned power outage. The outage began when heavy snow and extremely high winds caused issues with the radiator cooling systems associated with the diesel units. Hydro operators were unable to keep the radiators clear of snow and ice. Additional labourers were required to remove the ice and snow from the plant entrance as well as the radiator cooling systems which allowed for a restart of the diesel plant. At 1830 hours, February 17, power to all customers in Rigolet was restored.

On May 1, 2015 at 2025 hours, Hydro customers (141) serviced by the L'Anse au Loup feeder L2 in the communities of Pinware and Red Bay, Labrador began to experience an unplanned power outage. Crews investigated and determined that the outage was the result of conductor sleeve failures on a primary and neutral conductor in the distribution system. The problem was isolated through sectionalizing and nearly half the customers (70) were restored at 2330 hours. The remaining customers (71) were restored at 0202 hours on May 2, 2015, following completion of the repairs.

At 2129 hours, May 13, 2015, all customers (1,800) on Fogo Island and Change Islands experienced an unplanned power outage. The outage was caused by a trip of NP's line 142L which supplies the area. A NP crew was dispatched and found a faulty potential transformer at their Boyd's Cove Substation. Customers were restored at 0158 hours, May 14, 2015.

On June 9, 2015 at 1652 hours (Labrador time), 1224 customers in Labrador City, Labrador, experienced an unplanned power outage. Some customers experienced intermitted outages as Hydro was troubleshooting the problem. Hydro crews discovered the problem was caused by a primary connector coming in contact with another line. Customer outage information is as follows:

> Outage 1, Vanier Substation, Cabin Area, & Landfill Site: 474 customers, 1652 – 2000 hours, 3 hours 8 minutes.
> Outage 2, Hudson Station: 750 customers, 1652 - 2122 hours, 4 hours 30 minutes.

On June 12, 2015 at 1300 hours (Labrador time), 250 customers in Labrador City, Labrador, serviced by Quartzite Line 12 and Bartlett Line 5 experienced a planned power outage. The outage was required to safely perform upgrades to the distribution system. All customers were restored at 1800 hours.

On June 28, 2015 at 1300 hours (Labrador time), 1112 customers in Labrador City, Labrador, serviced by Lines 4, 5, and 17 experienced a planned power outage. The outage was required to safely perform upgrades to the distribution system. All customers were restored at 1815 hours.

On June 30, 2015 at 1300 hours (Labrador time), 116 customers in Labrador City, Labrador, serviced by Line 18 experienced a planned power outage. The outage was required to safely perform upgrades to the distribution system. All customers were restored at 1750 hours.

On July 5, 2015, 1916 customers supplied by Happy Valley Terminal Station Line 8 experienced an unplanned power outage. The outage occurred when Line 8 tripped due to a fault on the line. Hydro investigated, but did not determine a cause for the fault. These customers remained offline until the transmission system from Churchill Falls was returned to service following planned maintenance. The remaining customers continued to be supplied by the Happy Valley Gas Turbine.

> Outage 1: 0546 – 1424 hours, 8 hours 38 minutes, one customer (Muskrat Falls construction site - planned outage due to work on transmission system).
> Outage 2: 0651 – 1424 hours, seven hours 33 minutes, 1916 customers (Line 8).
>
> All customers were restored via the 138 kV transmission system (from Churchill Falls) at 1424 hours.

A voltage conversion is ongoing in Labrador City. Below are the outages related to safely perform that work in Q3.

> On July 18, 209 customers in Labrador City, serviced by Line 22 experienced a planned power outage.
>
> On July 25, 250 customers in Labrador City, serviced by portions of Line 2 and Line 8 experienced a planned power outage.

On July 26, 250 customers in Labrador City, serviced by portions of Line 22 and Line 23 experienced a planned power outage.

On August 06, 550 customers in Labrador City, serviced by Bartlett Substation Lines 2 & 5, and Quartzite Substation Line 12 experienced a planned power outage.

On August 15, 420 customers in Labrador City, serviced by Hudson Substation Line 18 and Quartzite Substation Line 8 experienced a planned power outage.

On August 23, 306 customers in Labrador City, serviced by Bartlett Substation Line 22 and 23 experienced a planned power outage.

On August 23, 306 customers in Labrador City, serviced by Bartlett Substation Line 22 and 23 experienced a planned power outage.

On September 2, 363 customers in Labrador City, Labrador, serviced by the Hudson Distribution System Lines 16 and 17experienced a planned power outage.

On August 15, there was a planned outage affecting customers of North West River and Sheshatshui on transmission line L7. The outage was required to safely perform maintenance to the transmission system.

On August 16, there was a planned outage affecting customers of North West River on a section of transmission line L7. The outage was required to safely perform maintenance to the transmission system.

On August 27, 14 customers, serviced by the L'Anse au Loup distribution system, began to experience an unplanned power outage. The outage was caused when one phase on a three phase tap broke off. On August 28, the 14 customers, serviced by the L'Anse au Loup distribution system were restored. The total outage duration was 19 hours and 42 minutes. The delay in restoring customers resulted from crews requiring a mandated rest period after working on the August 27 Port Hope Simpson outage before being dispatched to address the failed phase.

On September 2, all customers (170) in Rigolet, Labrador experienced a planned power outage. The outage was required to complete plant maintenance.

On September 20, 80 customers in Nain, Labrador experienced a planned power outage. The outage was required to safely complete upgrades to the distribution system.

On September 24, there was a planned outage affecting 80 customers in North West River. The outage was required to safely perform upgrades to the distribution system.

On September 26, approximately 400 customers in Nain, Labrador experienced a planned power outage. The outage was required to safely complete upgrades to the distribution system.

On September 27, approximately 478 customers in Nain, Labrador experienced a planned power outage. The outage was required to safely complete upgrades to the distribution system.

## Appendix C3: Underfrequency Load Shedding Events (Excluding Fourth Quarter)

On January 22, 2015, at 1156 hours, Holyrood Unit 1 tripped. With the removal of generation (approximately 90 MW) the system frequency dropped to 58.77 Hz resulting in the activation of the under frequency protection at NP and Corner Brook Pulp and Paper Limited. Total Island load at the time of the incident was 1271 MW. All NP customers (5,631) were reported to be restored within four minutes after the event occurred. Hydro advised Corner Brook Pulp and Paper that they could restore load within four minutes after the event occurred. **(Unsupplied Energy: 151 MW-Mins)**

| | |
|---|---|
| Load Shed: | |
| Newfoundland Power: | 26 MW |
| Corner Brook Pulp and Paper: | 15 MW |
| Total Load Shed: | 41 MW |

Hydro was conducting commissioning activities on a pump motor (U1 Light Oil Pump West). One of the activities was to rewire and commission this pump motor. In the act of closing the wiring panel door, a wire knocked loose from its termination, causing a short circuit. This short circuit tripped a feeder breaker supplying critical Burner Management System (BMS) equipment. As a result, the BMS tripped Unit 1.

Hydro inspected and corrected any other loose wires in the panel. Hydro has reviewed the incident internally and conducted a non-critical work stand-down.

On March 11, 2015, at 1052 hours, Holyrood Unit 1 tripped. With the removal of generation (approximately 120 MW) the system frequency dropped to 58.57 Hz resulting in the activation of the under frequency protection at NP (14,846 customers) and Corner Brook Pulp and Paper Limited. Total Island load at the time of the incident was 1438 MW. Hydro advised NP that they could restore load within three minutes after the event occurred (NP reported all customers restored within 17 minutes). Hydro advised Corner Brook Pulp and Paper that they could restore load within ten minutes after the event occurred. **(Unsupplied Energy: 771 MW-Mins)**

| | |
|---|---|
| Load Shed: | |
| Newfoundland Power: | 71 MW |
| Corner Brook Pulp and Paper: | 15 MW |
| Total Load Shed: | 86 MW |

Hydro's investigation has determined that equipment, inside a control system cabinet, was being replaced when inadvertently, an on/off power bar switch was triggered. Power was lost to a portion of the control system causing the burner management system (BMS) to trip the unit. Hydro has identified a failure to check/identify the task as the root cause.

On May 10, 2015, at 0714 hours, Holyrood Unit #1 tripped. With the removal of generation (approximately 70 MW) the system frequency dropped to 58.7 Hz resulting in the activation of the under frequency protection at NP (6,589 customers) and Corner Brook Pulp and Paper Limited. Total Island load at the time of the incident was 934 MW. NP reported all customers were restored within five minutes. Hydro advised Corner Brook Pulp and Paper that they could restore load within five minutes after the event occurred. **(Unsupplied Energy: 165 MW-Mins)**

| | |
|---|---|
| Load Shed: | |
| Newfoundland Power: | 18 MW |
| Corner Brook Pulp and Paper: | 15 MW |
| Total Load Shed: | 33 MW |

In order to safely perform upgrades to a distribution panel, the power supplying the panel needed to be removed. Hydro was in the process of switching the power supply feed when the supply to the auxiliary controls of a forced draft fan on Unit 1 was inadvertently removed. This caused the unit to trip.

Hydro has reviewed the switching procedures internally and engineering is in progress to determine the feasibility of changing the supply of the control power to a more robust location.

On July 10, 2015, both Granite Canal Unit and Upper Salmon Unit tripped offline when their associated transmission line (TL234) tripped due to a lightning strike. With the removal of generation (approximately 53 MW in total on both units) the system frequency dropped to 58.65 Hz resulting in the activation of the under frequency protection at NP (4,824 customers) and Corner Brook Pulp and Paper Limited (one Industrial Customer). Total Island load at the time of the incident was 727 MW. Hydro advised NP they could restore load within three minutes after the event occurred. **(Unsupplied Energy: 102 MW-Mins)**

| | |
|---|---|
| Load Shed: | |
| Newfoundland Power: | 9 MW |
| Corner Brook Pulp and Paper: | 15 MW |
| Total Load Shed: | 24 MW |

On August 05, 2015, both Bay d'Espoir Unit 7 and Transmission Line TL206 (Bay d'Espoir to Sunnyside) tripped offline due to a lightning strike in close proximity to the Bay d'Espoir Terminal Station #2. Hydro's initial investigation has determined no damage was incurred to the generation or transmission systems affected. With the removal of generation (approximately 129 MW) the system frequency dropped to 57.98 Hz resulting in the activation of the under frequency protection at NP (52,689 customers) and Hydro (4,276 customers). Total Island load at the time of the incident was 702 MW. Hydro advised NP they could restore load within six minutes after the event occurred. Hydro customers were restored by 1032 hours. **(Unsupplied Energy: 642 MW-Mins)**

| | |
|---|---|
| Load Shed: | |
| Newfoundland Power: | 100 MW |
| Hydro: | 9 MW |
| Total Load Shed: | 109 MW |

## Appendix C4: Other Significant Transmission System Disturbances – 2015

On the morning of March 4, 2015, Hydro was in the process of returning Unit 1 at the Holyrood Thermal Generating Station (Holyrood TGS) to service following a planned emergency maintenance outage. A

contingency plan was in place for the duration of that maintenance outage to ensure adequate electricity supply to customers. The Island Interconnected System generation reserves in the days and hours prior to the morning peak of March 4 were monitored and considered adequate for supply to customers.

At 00:28 hours on March 4, the Holyrood TGS advised Hydro's Energy Control Centre (ECC) that Unit 1 could be delayed coming on line. At 05:24 hours on March 4, the Holyrood TGS confirmed to Hydro's ECC that Unit 1 would not be on for the morning peak. The contingency plan to have the Holyrood combustion Turbine (CT) on line for the morning peak had been initiated the previous afternoon. However, shortly after 06:00 hours Hydro experienced unanticipated starting issues with the Holyrood CT, affecting reserves on the Avalon Peninsula.

The combination of both these units being unavailable as customers' morning demand rapidly increased caused system voltages to decline on the Avalon to a point where the Come by Chance capacitor banks low voltage trip setting was reached. This capacitor bank trip further reduced voltages on the Avalon, which tripped Holyrood Unit 3. Customers subsequently experienced power interruptions commencing at 07:14 hours. At the height of the power interruption, at approximately 07:20, 83,000 customers were affected.

Hydro personnel, in conjunction with NP, responded immediately to restore power in a safe and efficient manner. The Holyrood CT was brought on line at 07:25, and within 20 minutes approximately 20,000 customers were restored. By 08:15 hours a total of over 50,000 customers had been restored. By 10:30 hours, the majority of customers were restored. The remaining customers were restored by 12:32 hours.

Hydro filed a copy of its investigative report into these events with the Board in April as Power Outage/Incident Advisory - 2015-H-062.

In addition to the above Delivery Point outages and underfrequency events, there was another system event in July that impacted NP's customers. On July 1, transmission line 109L tripped at Sunnyside Terminal Station and transformer T2 tripped and locked out at Stony Brook Terminal Station. The operation of the transformer lock out separated the 230 kV and 138 kV systems at Stony Brook and the tripping of 109L isolated the 138 kV supply from Sunnyside into the Central Region. Due to major construction being carried out by NP at the Clarenville Substation, transmission lines 100L and 109L, which normally provide the 138 kV supply into the Central Region were reconfigured. Transmission line 100L was reconfigured to supply the Bonavista Peninsula radially from Sunnyside while 109L was interconnected with transmission line 124L to provide the 138 kV supply into the Central Region. With the tripping of 109L/124L and the Stony Brook 230 kV supply, the Central system was supplied radially from the 138 kV lines into to Stony Brook from Deer Lake. There were no immediate outages to customers, but at 2254 hours (six minutes after the initial trip) the 138 kV voltages decayed to the point whereNP under voltage protection operated to shed their customers at Wesleyville, Lewisporte and Norris Arm. Additionally, NP customers in Grand Falls were manually shed by NP's Control Center due to low voltages. The overall customer impact was approximately 14,600 NP customers for outage duration of between 11 and 21 minutes.

Field investigation into the transformer lock out discovered that the lightning arrestor on B-Phase on the 138 kV side of T2 had faulted. Transformer T2 was returned to service on July 6. Investigation into the tripping of transmission line 109L at Sunnyside identified that the Zone 1 ground distance protection setting had been calculated and applied incorrectly. The setting modifications were recommended by

NP and implemented by Hydro. After discussion with NP, the protection settings were corrected and new protection relay settings were issued to field personnel for implementation. These changes were completed on July 2.

# Appendix D: List of U.S.-Based Peers for Financial KPI Benchmarking

**Generation and Corporate Peer Group:**

Alcoa Power Generating Inc.
Allete, Inc.
Aquila, Inc.
Avista Corporation
Buckeye Power, Inc.
Cleco Power LLC
Electric Energy, Inc.
Entergy Mississippi, Inc.
Hawaiian Electric Company, Inc.
Indiana-Kentucky Electric Corporation
Kentucky Power Company
Ohio Valley Electric Corporation
Portland General Electric Company
Public Service Company of New Hampshire
Puget Sound Energy, Inc.
Savannah Electric and Power Company
Sierra Pacific Power Company
Southern Electric Generating Company
Southern Indiana Gas and Electric Company
The Empire District Electric Company

**Transmission Peer Group:**

AEP Texas North Company
Allete, Inc.
Aquila, Inc.
Avista Corporation
Central Illinois Public Service Company
Delmarva Power & Light Company
Entergy Mississippi, Inc.
Kentucky Utilities Company
MDU Resources Group, Inc.
Mississippi Power Company
New York State Electric & Gas Corporation
Northern Indiana Public Service Company
Northern States Power Company (Wisconsin)
Oklahoma Gas and Electric Company
Public Service Company of Colorado
Public Service Company of Oklahoma
Sierra Pacific Power Company
Southwestern Electric Power Company
Tucson Electric Power Company
Westar Energy, Inc.

**A REPORT TO**

**THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES**

# 2016 ANNUAL REPORT

**ON**

# KEY PERFORMANCE INDICATORS

*Pursuant to Order No. P.U. 14 (2004)*

## NEWFOUNDLAND AND LABRADOR HYDRO

# Table of Contents

1.0 Introduction 1

2.0 Overview of Key Performance Indicator Results 2

2.1 Overview ..... 2

2.2 Performance in 2016 versus 2016 Target ..... 3

3.0 Performance Indices 5

3.1 Reliability Performance Indicators ..... 5

3.1.1 Reliability KPI: Generation ..... 5

3.1.2 Reliability KPI: End User Performance ..... 10

3.1.3 Reliability KPI: Transmission ..... 14

3.1.4 Reliability KPI: Distribution ..... 21

3.1.5 Reliability KPI: Other ..... 28

3.2 Operating Performance Indicators ..... 32

3.2.1 Operating KPI: Generation ..... 32

3.3 Financial Performance Indicators ..... 34

3.3.1 Financial KPI: Corporate Operating, Maintenance and Administrative Expense (OM&A) per MWh delivered ..... 35

3.3.2 Financial KPI: Generation OM&A per MW Installed Capacity ..... 37

3.3.3 Generation OM&A per GWh generated ..... 37

3.3.4 Financial KPI: Transmission OM&A per Transmission Circuit km ..... 38

3.3.5 Financial KPI: Distribution OM&A per Distribution Circuit km ..... 39

3.4 Customer-Related Performance Indicators ..... 41

Appendix A: Rationale for Hydro's 2016 KPI Targets

Appendix B: Computation of Weighted Capability Factor and Factors Impacting Performance

Appendix C1: Significant Transmission Events – 2016

Appendix C2: Significant Distribution Events – 2016 (Excluding Fourth Quarter)

Appendix C3: Underfrequency Load Shedding Events (Excluding Fourth Quarter)

Appendix D: List of U.S.-Based Peers for Financial KPI Benchmarking

# 1.0 Introduction[1]

In Order No. P.U. 14(2004), the Board required Newfoundland and Labrador Hydro (Hydro) to file appropriate historic, current and forecast comparisons of reliability, operating, financial and other Key Performance Indicators (KPIs). These were ordered to be filed with Hydro's annual financial report, commencing in 2004.

In compliance with the above Order, Hydro has 14 individual KPIs within the following four general categories: Reliability, Operating, Financial, and Customer-Related.

Within each of these categories, KPI data is reported on a historic basis for Hydro. Where appropriate, KPIs are subcategorized based on whether they relate to generation, transmission, distribution or overall corporate activity. For most of the Reliability KPIs, data from the Canadian Electricity Association (CEA) is provided in this report, as has been the case in prior years. At the time of this report, CEA data has been published only to 2015. CEA data is unavailable for underfrequency load shedding, a reliability KPI, as this measure is unique to Hydro's Island Interconnected System. In the Operating category, the KPIs used to measure performance relate to two specific facilities within Hydro's system: Bay d'Espoir and Holyrood. For these two generation plants, performance is measured and compared on a year-over-year basis.

Section 2 of this report provides an overview of Hydro's KPI performance in 2016 compared with the prior year as well as a comparison of actual KPI results compared with targets.

Section 3 of this report provides a detailed analysis of each individual KPI within the four categories named above in Section 3. In addition, it provides fourth quarter data for transmission and distribution reliability which is routinely included in Hydro's quarterly

[1] This Report was filed with the Board on March 31, 2017 as Appendix E to the Quarterly Report (Q4). It has been reformatted; however, content has not changed.

regulatory reports. Section 3.3, Financial Performance Indicators, will be provided once Hydro's annual financial results have been audited and published.

## 2.0 Overview of Key Performance Indicator Results

### 2.1 Overview

A number of key indices measured by Hydro showed improvement when compared to 2015 or the targets for 2016. All indices are discussed in the following sections of this Appendix.

End User reliability measures improved from 2015 levels. The 2016 End User SAIFI improved to 1.30 interruptions per customer from 2.00 interruptions per customer in 2015. End User SAIDI for 2016 was 2.42 interruptions hours per customer compared to 3.07 interruptions hours per customers in 2015. Both measures were impacted by two major transmission interruptions to Newfoundland Power customers and six major transmission interruptions to Newfoundland & Labrador Hydro's distribution customers.

Generation availability did not change significantly in 2016 when compared to 2015. Hydro's overall weighted capability factor, which measures generating unit availability, declined was 77% compared to 80% in 2015. The availability of the Holyrood thermal plant was 60% in 2016, compared to 63.4% for 2015. The availability of gas turbines did not change significantly in 2016 when compared to 2015. The overall weighted capacity factor of these units was 79.3% in 2016 compared to 80% in 2015. The availability of Hydro's hydraulic plants was 85% in 2016 compared to 88% in 2015. With the exception of Units 1 and 2 at the Bay d'Espoir generating station, Hydro's hydraulic unit availability was consistent with historic performance. Impacting on the overall hydraulic unit availability were leaks in Penstock 1 which affected the performance of Bay d'Espoir Units 1 and 2.

- In the area of Derating-Adjusted Forced Outage Rate (DAFOR), performance across all generation classes was 10.0% in 2016, compared to 3.4% in 2015. The

thermal DAFOR was 19.4% in 2016 compared to 5.0% in 2015. The Hydraulic DAFOR was 5.51% in 2016 compared to 2.66% in 2015.

- The 2016 hydraulic conversion factor at Bay d'Espoir was impacted by higher reservoirs levels than experienced in previous years resulting in lower than target conversion factor.
- There were six under frequency load shedding in 2016, compared to eight events in 2015.
- Overall Transmission and Distribution reliability were impacted by an increase in unplanned outages in 2016, and offset by a reduction in the number and duration of planned outages. Both the frequency and duration of transmission delivery point outages improved in 2016, compared to 2015.

The 2016 operating KPI for energy conversion at Holyrood was primarily impacted by a higher average unit loading resulting in a lower conversion rate.

A review of all indices is contained in the following sections.

## 2.2 Performance in 2016 versus 2016 Target

The table below summarizes Hydro's KPI performance in 2016. The rationale for the 2016 targets was summarized in the March 2016 report to the Board entitled *2015 Annual Report on Key Performance Indicators*. The 2016 rationale is included in this report as Appendix A.

| Category | KPI | Units | 2016 Target | 2016 Results |
|---|---|---|---|---|
| Reliability | Weighted Capability Factor (WCF) | % | 79.9[2] | 77.1 |
| | DAFOR | % | 7.1 | 10.0 |
| | T-SAIDI | Minutes/Point | 530 | 325[3] |
| | T-SAIFI | Number/Point | 3.4 | 2.9 |
| | T-SARI | Minutes/Outage | 156 | 112 |
| | SAIDI | Hours/Customer | 12.1 | 15.7 |
| | SAIFI | Number/Customer | 5.5 | 6.6 |
| | End User SAIDI[4] | Hours/Customer | 2.2 | 2.4 |
| | End User SAIFI[5] | Number/Customer | 1.3 | 1.3 |
| | Underfrequency Load Shedding | # of events | 6 | 6 |
| Operating | Hydraulic CF | GWh/MCM | 0.433 | 0.432 |
| | Thermal CF | kWh/bbl | 607 | 608 |
| Financial[6] | Controllable Unit Cost | $/MWh | N/A | N/A |
| Other | Customer Satisfaction (Residential) | Max=100% | 80% | 90% |

[2] The Weighted Capability Factor target is based on planned annual maintenance outages, an allowance for other short duration maintenance outages and targeted forced outage durations.
[3] Transmission and distribution reliability performance is measured on combined planned and unplanned outages.
[4] New measure added in 2015, refer to section 3.1.2 for further details.
[5] New measure added in 2015, refer to section 3.1.2 for further details.
[6] To be provided when financial results are available.

# 3.0 Performance Indices

The following defines and describes detailed Key Performance Indicator data within four general categories: Reliability, Operating, Financial, and Customer-Related.

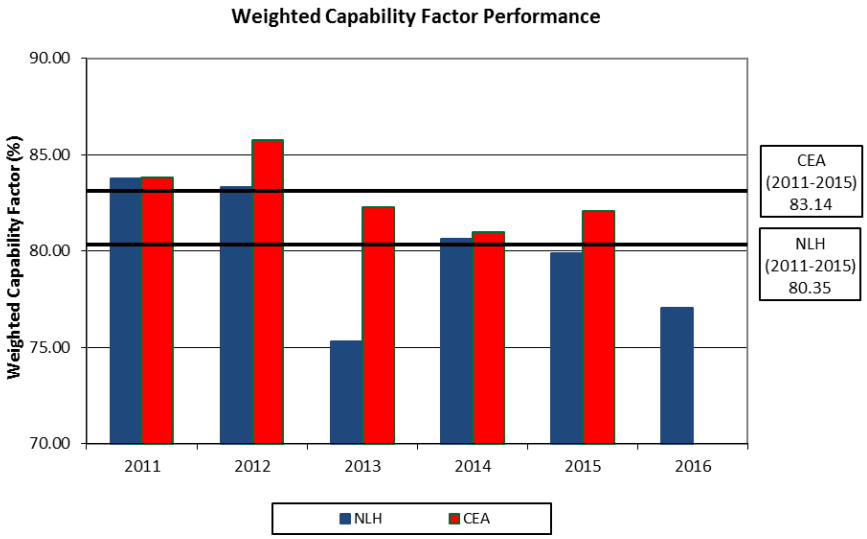
## 3.1 Reliability Performance Indicators

Hydro monitors reliability performance with eight separate metrics. These metrics have been divided into the following subcategories: Generation, Transmission, Distribution, and Other.

### 3.1.1 Reliability KPI: Generation

**a) Weighted Capability Factor (WCF) –** *a reliability KPI for generation assets that includes Hydro's thermal, gas turbine and hydroelectric generation assets on the Island and Labrador Interconnected Systems. The WCF measures the percentage of the time that a unit or a group of units is available to supply power at maximum continuous generating capacity. The factor is weighted to reflect the difference in generating unit sizes, meaning larger units have a greater impact on this measure.*

In 2016, Hydro's WCF was 77.1%, compared to 79.9% in 2015 and a target of 79.9%. The 2011 to 2015 Hydro five-year average (as last reported to the CEA) is 80.4%. The annual target for availability includes the time that units are out for maintenance. Therefore, the capability in any year is affected by the maintenance and capital work planned for that year. At no time in 2016 was there insufficient generation to meet customer requirements. Hydro plans required capital outages and schedules maintenance outages to ensure supply is available as required.




Thermal unit WCF was 59.9% in 2016 compared to 63.6% in 2015. The 2016 Thermal WCF target was 63.0%. Holyrood Unit 1 had a capability factor of 63.2%, Unit 2 had a capability factor of 56.0%, and Unit 3 had a capability factor of 60.5%. Holyrood Unit 1 was derated for a total of eight months through out 2016 due to airflow and reheater tube limitations, Holyrood Unit 2 was derated from February to June due to issues with the reheater section of the boiler, and Holyrood Unit 3 was derated on four occurrences in 2016 due to issues with broken generator leads, failed west fuel oil pump, air heater fouling, and fouling on the water intake.

Holyrood Unit 1 experienced a ten day maintenance outage in February to replace damaged reheater boiler tubes that had been identified during an inspection. Similar tube failures had caused two forced outages on Unit 2 in January and February, which required the replacement of the reheater tubes. In September, Unit 3 experienced a ten day maintenance outage to replace a reheater stop valve and to complete a boiler tube inspection.

Overall, Holyrood unit maintenance and planned outages were completed within the intended timeframes. Unit 3 experienced planned outages of approximately five months in total throughout the year. This extended outage was primarily required for the major

capital project to overhaul this unit as well as rewind the rotor. A Holyrood unit was operated throughout the summer months in 2016 in order to support the transmission into the Avalon Peninsula.

Overall, the hydraulic unit WCF performance was 85.2%, compared to 88.0% in 2015 and a target of 87.0%. The primary driver for the 85.2% WCF was two forced outages to Bay d'Espoir Units 1 and 2. Both of the forced outages were caused by leaks in the common Penstock no. 1. The first outage occurred on May 21, and an investigation attributed the leak to a defective weld. Repairs were completed on June 3 and both units were returned to service.

The second leak in Penstock no. 1 occurred on September 14, this leak was similar to the first and located in the same area. Investigations into the leak recommended refurbishing the welds along the upper section of the penstock between the intake and surge tank. Both units were returned to service on November 30. Removing the impact of this penstock leak on Bay d'Espoir Units 1 and 2 from the hydraulic WCF, results in an improved annual hydraulic WCF outcome of 88%.

Gas turbine availability declined slightly to 79.3% in 2016 from 80.2% in 2015. The 2016 gas turbine WCF target was 89.0%. The Hardwoods gas turbine experienced a forced outage from November 24 to December 2 due a loose connection in the circuit between the Automatic Voltage Regulator and the Exciter which prevented the unit from synchronizing to the interconnected system. The Stephenville gas turbine was impacted by a forced outage from August 2 to August 5 due to a lube oil leak in the alternator module. There was another forced outage to this unit from August 9 to August 19 due to the presence of debris on the metallic chip detectors observed during a routine inspection. The debris was subsequently analyzed and found to be minor very fine particles and not a cause of concern. The lubricating oil was analyzed and found to be in satisfactory condition for continued operation.

Calculation details for weighted capability as well as a list of factors that can impact KPI performance are included in Appendix B of this report.

---

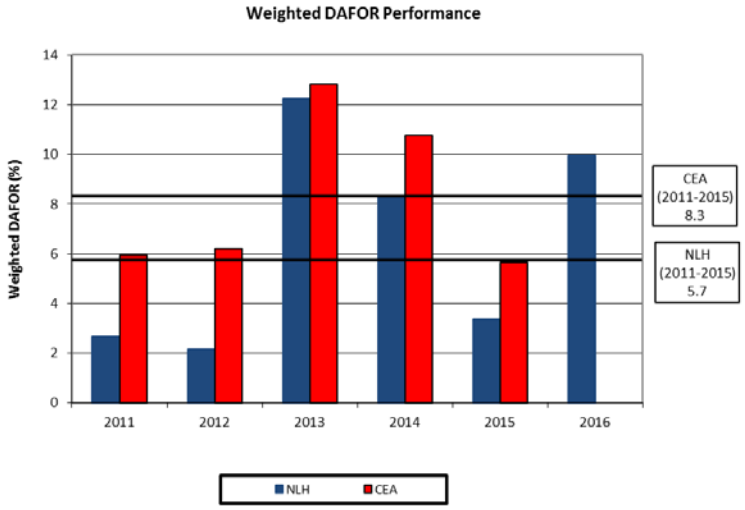
**b) Weighted Derating-Adjusted Forced Outage Rate (DAFOR)** - *a reliability KPI for generation assets that includes Hydro's thermal and hydroelectric generation assets on the interconnected systems*[7]*. DAFOR measures the percentage of the time that a unit or group of units is unable to generate at its Maximum Continuous Rating (MCR) due to forced outages. The KPI is weighted to reflect differences in generating unit sizes.*

---

In 2016, Hydro's weighted DAFOR was 10.0%, compared to 3.4% in 2015. The 2016 target was 7.17%. The thermal DAFOR for 2015 was 19.4%, compared to 5.0% in 2015 and a target of 19.0%. The thermal DAFOR was impacted by the boiler tubes on Holyrood Units 1 and 2. The hydraulic DAFOR was 5.5% compared to 2.7% in 2015 and a target of 0.9%. The hydraulic DAFOR was impacted by Bay d'Espoir Units 1 and 2 outage due to penstock issues. These issues contributed approximately 86% to the overall 2016 hydraulic DAFOR.

Hydro's overall weighted DAFOR for the period 2011 to 2015 is 5.7%, compared to the equivalently weighted national average of 8.3% for the same period.

[7] DAFOR is not applicable to the gas turbines because of the gas turbines' low operating hours.




**c) Generation Equipment Performance**

The table below highlights the various performance indices for Hydro's generation facilities. Indices for 2015 and for the latest five year CEA national average (2011-2015) are included for comparison.

**Generation Performance Indices**

| **Index** | | **Hydraulic** | **Thermal** | **Gas Turbine** |
|---|---|---|---|---|
| **Failure Rate** | NLH 2016 | 1.84 | 6.87 | 26.84 |
| (Forced Outages per 8,760 | NLH 2015 | 1.34 | 9.07 | 57.01 |
| operating hours) | CEA '11-'15 | 2.12 | 8.55 | 90.11 |
| **Incapability** | NLH 2016 | 14.80 | 40.11 | 20.70 |
| **Factor** | NLH 2015 | 11.70 | 36.60 | 27.21 |
| (Percent of Time) | CEA '11-'15 | 11.78 | 26.65 | 17.67 |
| **Derating Adjusted Forced** | NLH 2016 | 5.51 | 19.42 | |
| **Outage Rate** | NLH 2015 | 2.66 | 5.04 | |
| (Percent of Time) | CEA '11-'15 | 5.56 | 13.75 | |
| **Utilization** | NLH 2016 | | | 9.35 |
| **Forced Outage** | NLH 2015 | | | 10.55 |
| **Probability** (Percent of Time) | CEA '11-'15 | | | 21.17 |

***Hydraulic Unit Performance***

The forced outage to Units 1 and 2 at Bay d'Espoir, due a penstock issue impacted performance for all hydraulic unit measures in 2016. However, both the Failure Rate and DAFOR performance in 2016 remain at levels better than the national five year averages.

***Thermal Unit Performance***

Thermal unit performance improved considerably in 2016 in the area of Failure Rate, when compared to 2015. DAFOR and Incapability Factor performance declined in 2016, when compared to 2015, primarily due to an extended derating on Holyrood Units 1 and 2 due to airflow issues and boiler tube issues.

***Gas Turbine Unit Performance***

The Failure Rate, Incapability Factor and Utilization Forced Outage Probability (UFOP) performance of Hydro's gas turbines improved in 2016 when compared to 2015. Of particular importance to Hydro's gas turbines fleet is the UFOP which measure the degree to which a standby unit can be called upon to supply load when requested. The UFOP in 2016 was 9.4%, improving from 10.6% in 2015 and the CEA five year average of 21.2%.

**3.1.2 Reliability KPI: End User Performance**

This performance index was developed to measure the reliability of all end users of electricity in the province supplied by Newfoundland & Labrador Hydro. The measure is a combination of Hydro's service continuity data and Newfoundland Power (NP) service continuity data for Loss of Supply outages resulting from events on Hydro's transmission system. Therefore, the SAIFI and SAIDI data below is a measure of the duration and frequency of service interruptions experienced as a result of Hydro system events. This does not reflect interruptions to NLH or NP customers from issues on NP system.

Targets were developed using the past performance of Hydro and NP service continuity data. The effects of the significant interruptions on January 11, 2013, January 2 to 8, 2014, March 4, 2015 and August 5, 2015 were removed from the data and a modified 2011 to 2015 five year average was created. These events were removed due to the significant effect these events had on the five year data set. This is a normal practice of utilities to remove data associated with major events. This modified average was then compared to the 2015 CEA Region 2 Loss of Supply outcome. The 2016 target was set using the modified 2011 to 2015 average with the goal of reaching the 2015 CEA Region 2 Loss of Supply value in five years.

The SAIFI and SAIDI values add cumulatively through the year, with the final targets for SAIFI and SAIDI set at 1.29 interruptions/customer and 2.17 interruption minutes/customer, respectively.

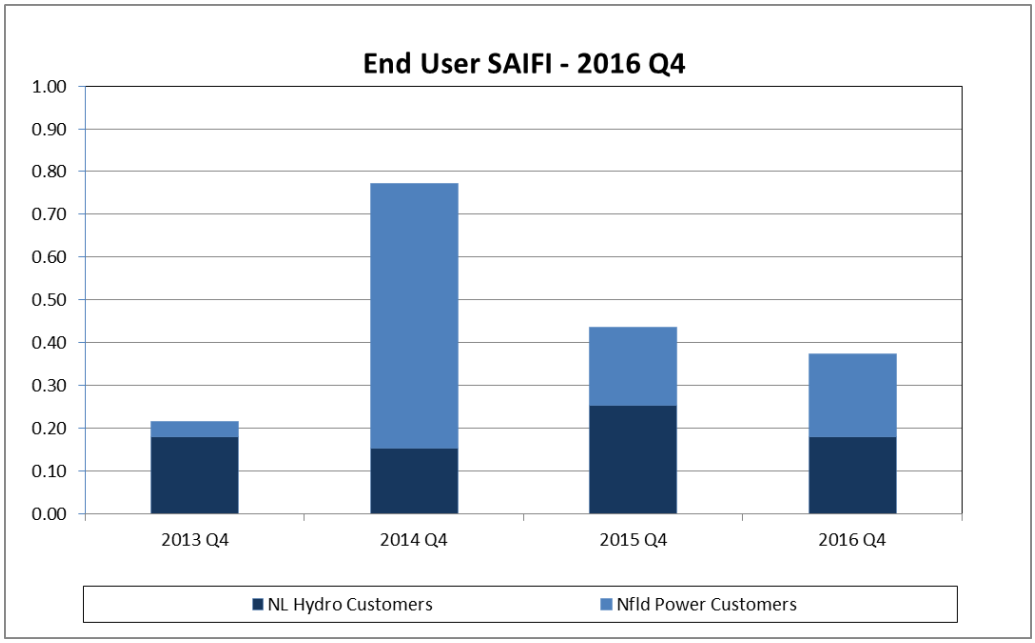
**End User Service Continuity Performance**

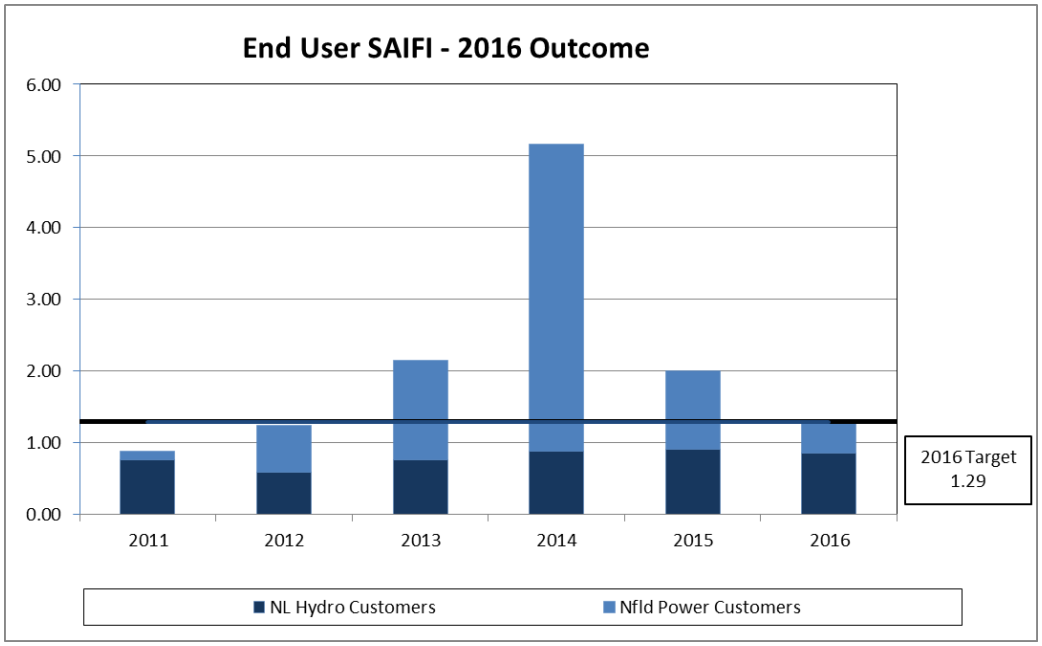
| | SAIFI | SAIDI |
|---|---|---|
| 2016 Q4 | 0.37 | 0.63 |
| 2015 Q4 | 0.44 | 0.65 |
| 2016 Outcome | 1.30 | 2.42 |
| Annual Target | 1.29 | 2.17 |
| 2011 to 2015 Average | 2.07 | 5.00 |

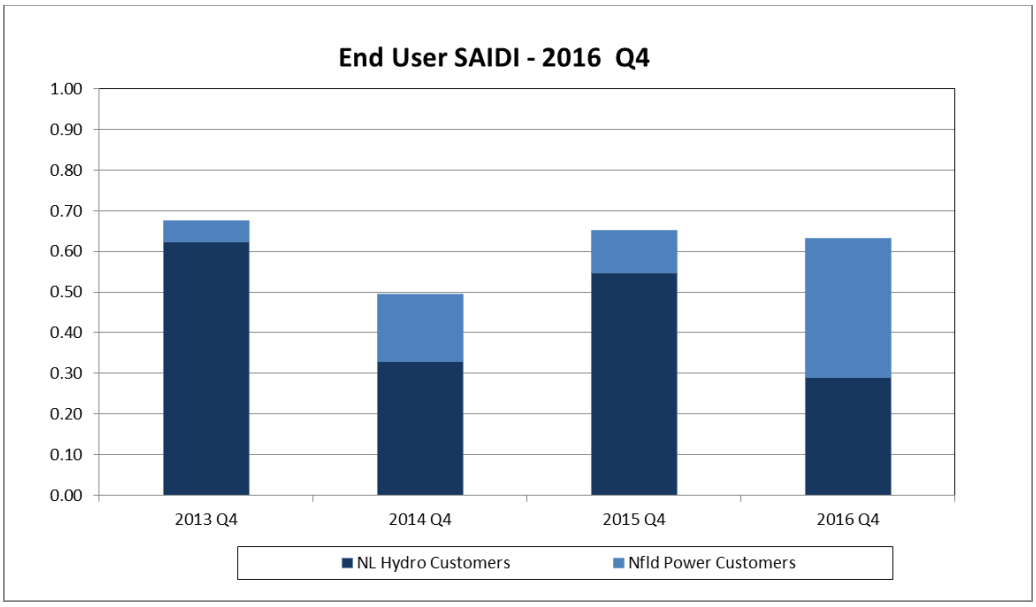
The fourth quarter performance was affected by three underfrequency events and two significant transmission outages. The under frequency events are described in detail in a later section of this report. The first significant transmission event occurred in November to transmission line TL219, effecting NP customers on the Burin Peninsula.[8] The second event effected NP customers in the Port Aux Basque area on December 16.[9] These two events contributed 81% of the total 2016 NP portion of the End User SAIDI.

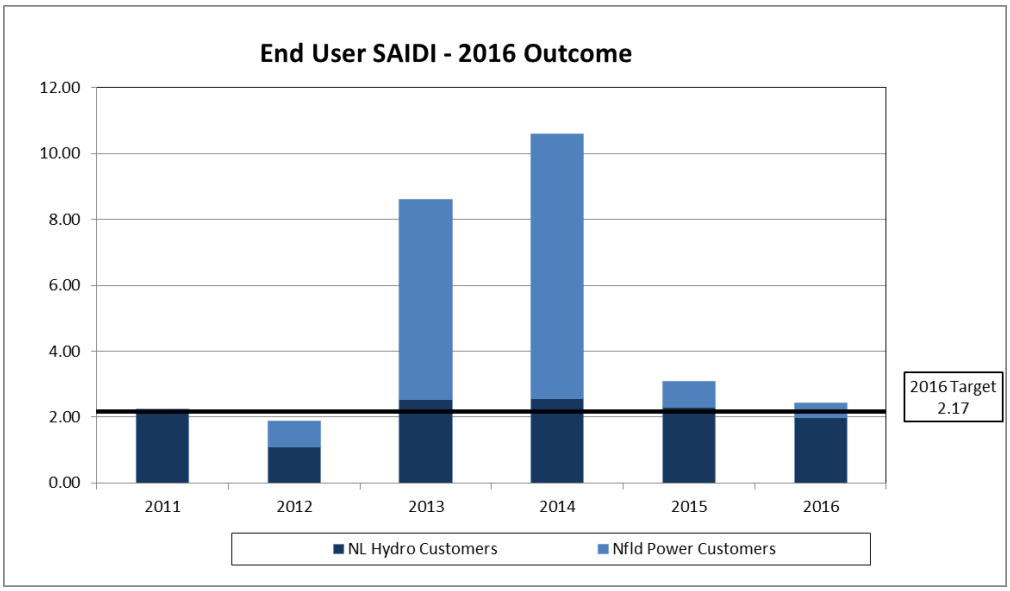
[8] Refer to Appendix C1, Event 8 for further details.
[9] Refer to Appendix C1, Event 9 for further details.

Hydro customers were affected by the significant transmission events described in Appendix C1 and the significant distribution events described in Appendix C2 and Section 3.1.4 of this report.




End User SAIDI - 2016 Q4
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
2013 Q4
2014 Q4
2015 Q4
2016 Q4
NL Hydro Customers
Nfld Power Customers

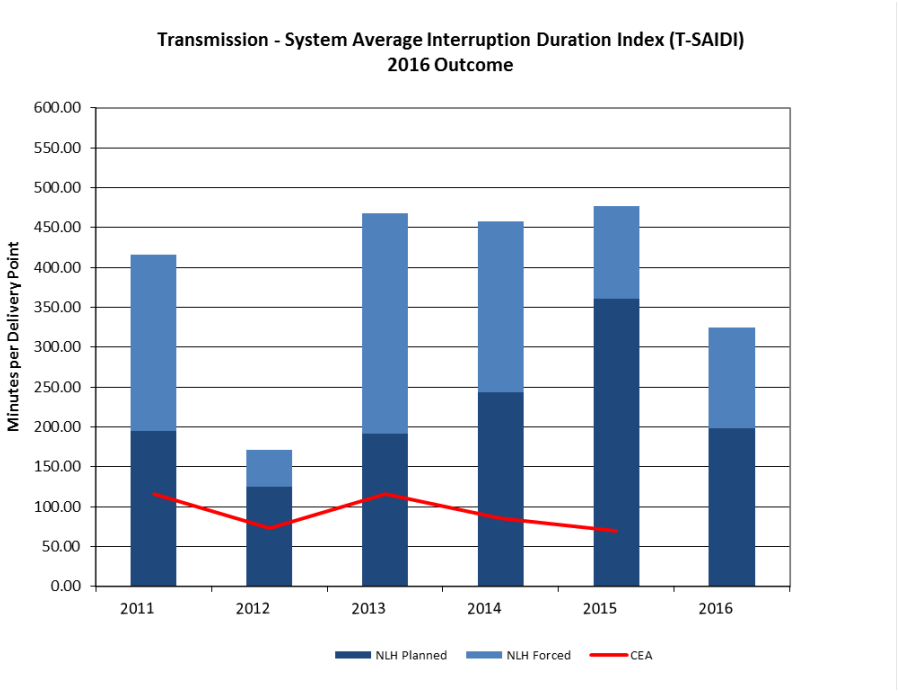

End User SAIDI - 2016 Outcome
12.00
10.00
8.00
6.00
4.00
2.00
0.00
2011
2012
2013
2014
2015
2016
2016 Target
2.17
NL Hydro Customers
Nfld Power Customers

### 3.1.3 Reliability KPI: Transmission

**a) Transmission System Average Interruption Duration Index (T-SAIDI)** - *reliability KPI for bulk transmission assets which measures the average duration of outages in minutes per delivery point.*

The fourth quarter T-SAIDI improved to 65 minutes per delivery point (forced and planned combined) compared to 128 minutes in 2015.

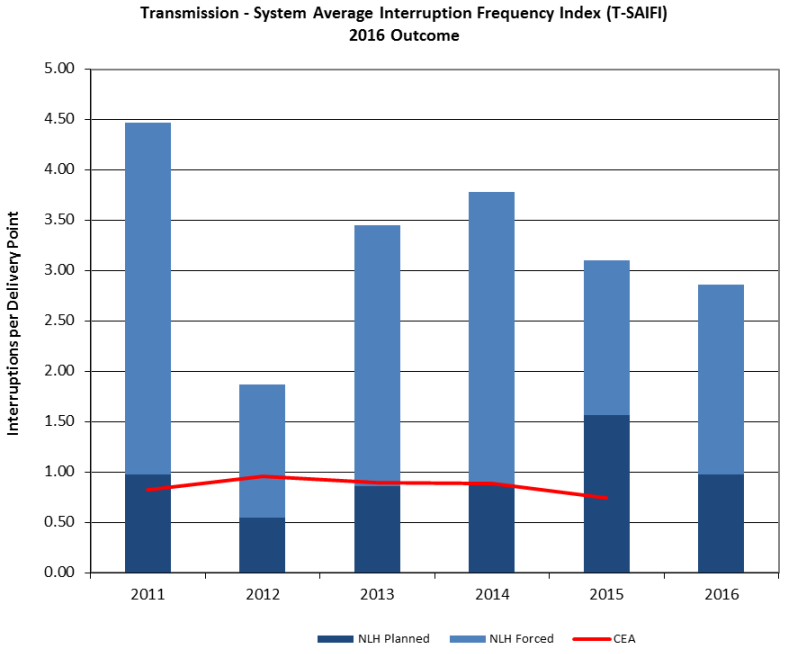
The total 2016 T-SAIDI was 325 minutes per delivery point, improved from a 2015 total T-SAIDI performance of 476 minutes per delivery point. The forced outage duration in 2016 was 127 minutes, compared to 116 minutes in 2015. The planned outage duration was 198 minutes, compared to 361 minutes in 2015. The decrease in the T-SAIDI for planned outages was the result of increased focus of reducing customer outage duration.



**b) Transmission System Average Interruption Frequency Index (T-SAIFI)** - *a reliability KPI for bulk transmission assets that measures the average number of sustained outages per delivery point*.

The fourth quarter T-SAIFI was 0.68 outages per bulk delivery point, with contributions of forced and planned outage frequency of 0.42 and 0.27, respectively. This compares with a 2015 fourth quarter T-SAIFI of 1.05 outages per bulk delivery point.

The 2016 T-SAIFI was 2.87 outages per bulk delivery point, improved from a 2015 T-SAIFI result of 3.10 outages per delivery point. The number of forced outages per delivery point in 2016 was 1.88, compared to 1.53 in 2015. The number of planned outages per delivery point in 2016 was 0.98 compared to 1.57 in 2015.

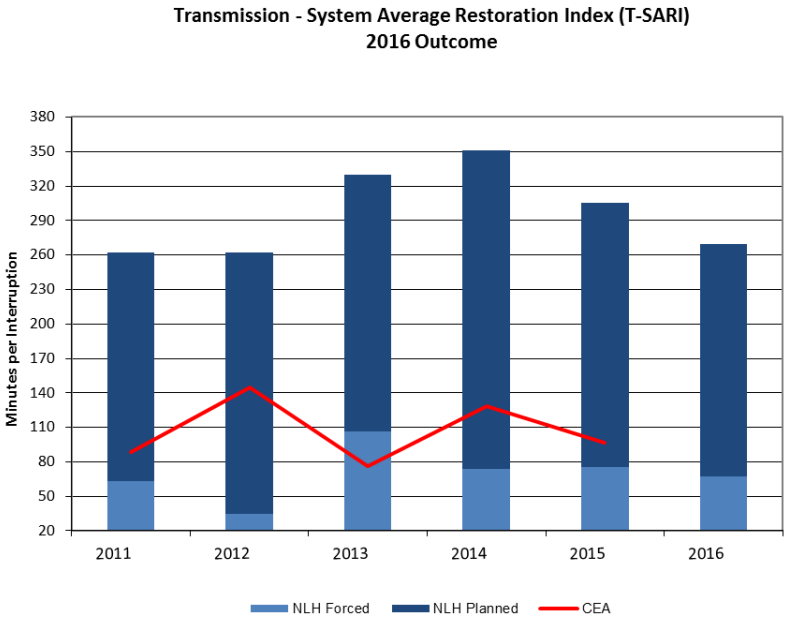


**c) Transmission System Average Restoration Index (T-SARI)** - *reliability KPI for bulk transmission assets which measures the average duration per transmission interruption. T-SARI is calculated by dividing T-SAIDI by T-SAIFI.*

Hydro's transmission T-SARI improved was 95 minutes per interruption for the fourth quarter of 2016, compared to 122 minutes per interruption during the same quarter in 2015. The forced outage component of T-SARI was 97 minutes per interruption, compared to 51 minutes per interruption in 2015. The planned outage component of T-SARI was 92 minutes per interruption compared to 179 minutes per interruption in 2015.

Hydro's overall transmission T-SARI for 2016 was 270 minutes per interruption, compared to 306 minutes per interruption in 2015. The forced outage component of T-SARI was 67 minutes per interruption, compared to 76 minutes per interruption in 2015. The planned outage component of T-SARI was 202 minutes per interruption, compared to 230 minutes per interruption in 2015.

Hydro's total T-SARI performance improved in 2016 compared to 2015. This is owing to a reduction in both T-SAIFI and T-SAIDI.




There were 11 forced transmission outages and nine planned transmission outages in the fourth quarter. A summary of these outages follows:

***Forced***

- On October 14, customers (606) supplied by the Roddickton distribution system, feeders L3 and L4, experienced an unplanned power outage of five minutes. The outage occurred during switching to complete the annual function testing on circuit breaker B1L57 at the Roddickton Terminal Station.
- On October 23, customers (5,201) supplied by the Happy Valley Terminal Station experienced an unplanned power outage of two minutes. The outage occurred during the energization process of the new power transformer - T4. A transformer differential protection relay tripped due to a set of shorted current transformers on T4.
- On November 9, NP customers (1,421) supplied by Western Avalon Terminal Station via 66 kV Bus 2, experienced an unplanned power outage of one hour and 26 minutes. The outage was caused by moisture in the gas pressure relay on transformer GT1 which operated the lockout on transformer T1 and subsequently tripped the bus.

- On November 17, customers (3,056) supplied by Plum Point, Bear Cove, Roddickton and Main Brook Terminal Stations, experienced an unplanned power outage of 12 minutes. The outage was required to interconnect the mobile substation with the Hawke's Bay Terminal Station. The mobile will be connected in Hawke's Bay during the winter.
- On November 19, customers (1,941) supplied by transmission line TL226 from the Deer Lake Terminal Station, experienced an unplanned power outage of six minutes. The outage was caused by adverse weather during a snow storm.
- On November 21, NP customers (13,135) supplied by Sunnyside Terminal Station via transmission line TL219, experienced an unplanned power outage of three hours and 34 minutes. NP restored some customers with the Greenhill gas turbine and the remaining customers were restored when TL219 was put back into service. TL219 tripped due to two lightning strikes, the second strike resulted in a flashover through breaker B3L19. This breaker is scheduled to be overhauled in 2017.
- On November 25, NP customers (1,160) supplied by the Bay L'Argent Terminal Station and 468 customers supplied by the Monkstown Terminal Station experienced an unplanned power outage of 30 minutes. The outage was caused by the failure of disconnect switch L12-1 at Monkstown to fully close during switching to restore TL212 (Monkstown to Sunnyside section).
- On November 27, all customers (7,859) north of Berry Hill Terminal Station experienced an unplanned power outage. Customer outage details are listed below. The outage was caused by a tree falling on transmission line TL239, breaking a phase conductor. The Hawke's Bay and St. Anthony Diesel plants were started to support the 66 kV system to enable customer restoration. Feeder restoration details are provided as follows:

**Event - TL239 trip - Nov 27, 2016**

| Delivery Point Affected | Start Time | Time of Restoration | Outage Duration (mins) | Load Loss (MW) | MW-Mins |
|---|---|---|---|---|---|
| Cow Head | 22:36 | 23:03 | 27 | 1.1 | 29.7 |
| Parson's Pond | 22:36 | 23:04 | 28 | 0.4 | 11.2 |
| Daniel's Harbour | 22:36 | 23:04 | 28 | 0.8 | 22.4 |
| Hawke's Bay | 22:36 | 23:04 | 28 | 4 | 112 |
| Plum Point | 22:36 | 23:05 | 29 | 2.3 | 66.7 |
| Bear Cove | 22:36 | 23:16 | 40 | 3.3 | 132 |
| Main Brook | 22:36 | 23:44 | 68 | 0.4 | 27.2 |
| Roddickton | 22:36 | 23:44 | 68 | 1.6 | 108.8 |
| St Anthony | 22:36 | 23:52 | 51 | 6.4 | 466.1 |

- On December 16, NP customers (3,563) supplied by transmission line TL215 in the Port Aux Basque area experienced an unplanned power outage of 12 hours and 40 minutes due to loss of supply from Hydro. Following restoration of the line, the outage continued for NP customers due to damage on the distribution system. The line outage was caused by the failure of a crossarm pin due to extreme high winds in the area.
- On December 30, customers (269) supplied by Parson's Pond Terminal Station experienced an unplanned power outage of two hours and 12 minutes. The outage occurred after a pole broke on transmission line TL227 due to extremely high winds.
- On December 30, customers (1,317) supplied by Hawke's Bay Terminal Station experienced an unplanned power outage of 49 minutes. The outage occurred after transmission line TL259 reclosed at Berry Hill causing a voltage dip that resulted in the mobile substation tripping at Hawke's Bay.

***Planned***

- On October 16, customers (2,118) on the Great Northern Peninsula experienced planned power outages of various times, refer to the listing below. The outages were required to complete corrective maintenance on transmission line TL241 line hardware. Customers supplied by the St. Anthony, Main Brook and Roddickton feeders L1 and L2 were supplied by the St. Anthony Diesel Plant and did not experience power outages.

- Plum Point L1 – 343 customers – five hours and 29 minutes (329 minutes);
- Plum Point L2 – 627 customers – five hours and 29 minutes (329 minutes);
- Bear Cove L4 – 244 customers – five hours and 29 minutes (329 minutes);
- Bear Cove L6 – 698 customers – five hours and 29 minutes (329 minutes); and
- Roddickton L3 – 206 customers – three hours and 32 minutes (212 minutes).

- On October 23, customers (2,202) supplied by the South Brook Terminal Station experienced a planned power outage of up to two hours and 53 minutes. The outage was required to remove the mobile transformer (P235) after maintenance was completed on the 138 kV disconnect switches.
- On October 24, NP customers (1, 577) supplied by Western Avalon Terminal Station experienced a planned power outage of up to three hours and 48 minutes. The outage was required to complete PMs on Bus B2 disconnects, replace insulators on Bus B2, and complete CMs on disconnect switch B2T1-1.
- On November 6, NP customers (1,598) supplied by Springdale Terminal Station experienced a planned power outage of one hour and 28 minutes. The outage was required to repair the station ground grid after it was damaged by vandals. Corrective maintenance was also completed on Bus B1 potential transformers.
- On November 20, NP customers (665) supplied by the Buchans Terminal Station experienced a planned power outage of seven minutes. The outage was required to function test circuit breaker B2T1 at Buchans.

- On November 20, Duck Pond Mine experienced a planned power outage of seven minutes. The outage was required to function test circuit breaker B2T1 at Buchans.
- On December 1, customers (287) supplied by Jackson’s Arm Terminal Station (488) and Hampden Terminal Station experienced a planned power outage of five minutes. The outage was required to interconnect the new Taylor's Pond

Terminal Station. This is a single phase supply to a communications repeater site owned and operated by the Lower Churchill Project.

- On December 1, customers (1,155) supplied by Rocky Harbour Terminal Station experienced a planned power outage of 19 minutes. The outage was required to obtain an oil sample from transformer T1.
- On December 5, customers (1,317) supplied by Hawke's Bay Terminal Station experienced a planned power outage of 11 minutes. The outage was required to energize the mobile substation at Hawke's Bay for work on TL221. The mobile will be located in Hawke's Bay during the winter.

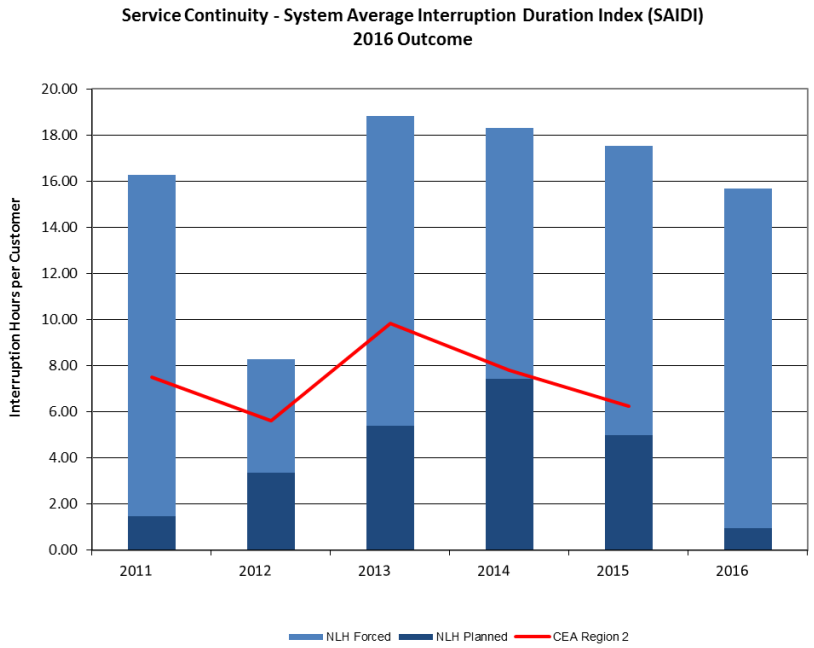
### 3.1.4 Reliability KPI: Distribution

**a) System Average Interruption Duration Index (SAIDI)** - *a reliability KPI for distribution service and it measures service continuity in terms of the average cumulative duration of outages per customer served during the year.*

In the fourth quarter of 2016, SAIDI performance was 2.32 hours per customer, compared to 4.19 hours per customer during the same quarter of 2015.

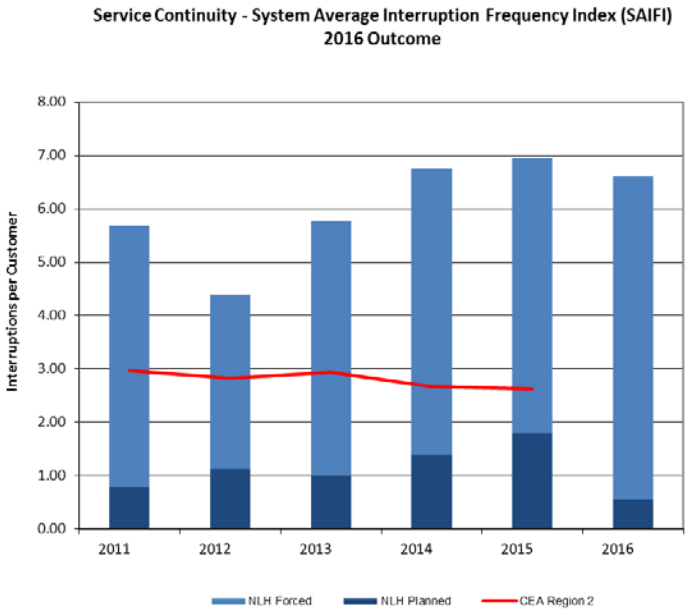
The total 2016 SAIDI was 15.68 hours per customer, compared to 17.54 hours per customer in 2015 and a target of 12.08 in 2016.

The main contributors to deteriorated SAIDI performance were unplanned outages in the Great Northern and Connaigre Peninsulas. In March, all customers north of Cow Head experienced an interruption due to a hardware failure on transmission line TL259. In May, customers on the Connaigre were affected by a forest fire under transmission line TL220 and equipment failure at the Barachoix Terminal Station.




**b) System Average Interruption Frequency Index (SAIFI)** - *reliability KPI for distribution service which measures the average cumulative number of sustained interruptions per customer per year.*

In the fourth quarter of 2016, SAIFI for was 1.43 interruptions per customer, compared to 1.93 interruptions per customer during the same quarter of 2015. The total 2016 SAIFI was 6.62 interruptions per customer, compared to 6.95 interruptions per customer in 2015 and compared to a target of 5.48 interruptions per customer in 2016.




The outages during the fourth quarter resulted from a variety of causes and effective most regions:

- On October 21, 855 customers supplied by the Happy Valley Distribution system feeder L7 experienced a planned outage of three hours and 49 minutes. (229 mins) The outage occurred during the energization process of new power transformer T4. The loading in the Happy Valley area had increased above the capability of the local generation and the customer on feeder L7 were shed. The remaining customers in the Happy Valley area were supplied by the gas turbine and North Plant diesel units during the outage to the Happy Valley 138 kV bus.
- On October 23, 855 customers supplied by the Happy Valley Distribution system feeder L7 experienced a planned outage of two hours and 16 minutes. (136 mins) The outage occurred during the energization process of new power transformer T4. The loading in the Happy Valley area had increased above the capability of the local generation and the customer on feeder L7 were shed. The remaining customers in the Happy Valley area were supplied by the gas turbine and North Plant diesel units during the outage to the Happy Valley 138 kV bus.
- On November 4, 225 customers supplied by Port Hope Simpson Distribution system experienced an unplanned power outage of 19 hours. The outage

occurred after the main power transformer at the diesel plant failed. A replacement transformer was bought in from Cartwright and used to restore customers.

- On November 6, 250 customers in Labrador City, Labrador, serviced by Line 3 experienced a planned power outage of two hours in 10 minutes. The outage was required to tie in a primary pole for switching a customer from underground to overhead service.
- On November 17, Bottom Waters L1 (384 customers) experienced an unplanned power outage of 7 hours and 57 mins. The outage occurred due to an insulator failure (Hendrix type) on pole #122.
- On November 27, 125 customers in Little Bay Islands experienced an unplanned power outage of 14 hours and 10 minutes. The outage occurred after a tree fell on the distribution line. The line crew arrived on site after using the ferry to access the island. Customers were restored at 1030 hours on November 28.
- On December 11, 234 customers in Goose Cove (St. Anthony Distribution System) experienced an unplanned outage of three hours. The outage was due to a phase conductor which had burnt and fell to ground.
- On December 11, 234 customers in Goose Cove (St. Anthony Distribution System) experienced a second unplanned outage of four hours and 30 minutes. Crews had found a blown fuse on the primary line.
- On December 15 (outage 2), 565 customers in Hermitage, Seal Cove and Gaultois (Barachoix Distribution System) experienced an unplanned outage of four hours and 50 minutes. The outage was caused by a broken conductor on the primary line.
- On December 15, 810 customers supplied by the English Harbour West Distribution System experienced an unplanned outage of four hours. The outage was caused by a broken conductor on the primary line.

- On December 16, 175 customers in Change Islands (Farewell Head Distribution System) experienced an unplanned outage of ten hours and 25 minutes. The outage was caused by a broken conductor on the primary line.
- On December 16, 66 customers in Lapoile experienced an unplanned outage of seven hours. The outage was caused by broken line hardware.
- On December 16, 302 customers in Trout River (Glenburine Distribution System) experienced an unplanned outage of five hours and 24 minutes. The outage was caused by a severe winter storm. A line patrol found no line damage.
- On December 17, 620 customers in Joe Batts Arm, Tilting, Shoal Bay (Farewell Head Distribution System) experienced an unplanned outage of 11 hours and 10 mins. The outage was caused by a severe winter storm. A line patrol found no line damage.
- On December 18 (outage 2), 66 customers in Lapoile experienced an unplanned outage of 35 hours and 15 minutes. A line patrol found line damage to three structures (one floating neutral and two structures with cross-arm bolts broken off). Repairs were completed and the line was restored.

A summary of the most significant distribution system interruptions for the first three quarters of 2016 (i.e., outages generally to a complete system with an extended outage duration) are contained in Appendix C2.

**c) Additional Information**

As per Hydro's regular quarterly report, this section provides more detailed information on distribution system interruptions with performance broken down by Area, Origin, and Type.

## Rural Systems Service Continuity Performance by Area

| SAIFI (Number per Period) | | | | | |
|---|---|---|---|---|---|
| **Area** | **Fourth Quarter** | | **12 Mths to Date** | | **5 Year** |
| | **2016** | **2015** | **2016** | **2015** | **Average** |
| **Central** | | | | | |
| Interconnected | 1.09 | 0.86 | 5.40 | 3.97 | 3.57 |
| Isolated | 1.21 | 0.41 | 2.35 | 2.34 | 2.89 |
| **Northern** | | | | | |
| Interconnected | 2.43 | 2.72 | 9.86 | 6.26 | 6.74 |
| Isolated | 0.95 | 2.00 | 8.19 | 9.05 | 8.74 |
| **Labrador** | | | | | |
| Interconnected | 1.01 | 2.30 | 5.08 | 10.45 | 7.84 |
| Isolated | 1.60 | 3.84 | 7.44 | 10.83 | 9.59 |
| Total | 1.43 | 1.93 | 6.62 | 6.95 | 6.12 |

Note: System Average Interruption Frequency Index (SAIFI) is the average number of interruptions per customer. It is calculated by dividing the number of customers that have experienced an outage by the total number of customers in an area

| SAIDI (Hours per Period) | | | | | |
|---|---|---|---|---|---|
| **Area** | **Fourth Quarter** | | **12 Mths to Date** | | **5 Year** |
| | **2016** | **2015** | **2016** | **2015** | **Average** |
| **Central** | | | | | |
| Interconnected | 2.85 | 3.12 | 21.88 | 12.78 | 13.94 |
| Isolated | 4.43 | 0.31 | 4.97 | 0.60 | 3.62 |
| **Northern** | | | | | |
| Interconnected | 2.70 | 5.69 | 16.18 | 13.65 | 16.11 |
| Isolated | 2.46 | 1.45 | 7.32 | 6.81 | 9.48 |
| **Labrador** | | | | | |
| Interconnected | 0.59 | 3.77 | 10.65 | 28.54 | 20.53 |
| Isolated | 5.93 | 10.92 | 12.23 | 23.39 | 14.64 |
| Total | 2.32 | 4.19 | 15.68 | 17.46 | 15.96 |

Note: System Average Interruption Duration Index (SAIDI) is the average interruption duration per customer. It is calculated by dividing the number of customer-outage-hours (e.g. a two-hour outage affecting 50 customers equals 100 customer-outage-hours) by the total number of customers in an area.

## Rural Systems Service Continuity Performance by Origin

**SAIFI (Number per Period)**

| Area | Fourth Quarter 2016 | Fourth Quarter 2015 | 12 Mths to Date 2016 | 12 Mths to Date 2015 | 5 Year Average |
|---|---|---|---|---|---|
| Loss of Supply – Transmission | 0.66 | 0.79 | 4.12 | 2.95 | 2.49 |
| Loss of Supply – NF Power | 0.01 | 0.00 | 0.04 | 0.01 | 0.01 |
| Loss of Supply – Isolated | 0.07 | 0.08 | 0.41 | 0.39 | 0.47 |
| Loss of Supply – L'Anse au Loup | 0.03 | 0.03 | 0.10 | 0.16 | 0.11 |
| Distribution | 0.66 | 1.03 | 1.95 | 3.44 | 3.04 |
| Total | 1.43 | 1.93 | 6.62 | 6.95 | 6.12 |

Note: System Average Interruption Frequency Index (SAIFI) is the average number of interruptions per customer. It is calculated by dividing the number of customers that have experienced an outage by the total number of customers.

**SAIDI (Hours per Period)**

| Area | Fourth Quarter 2016 | Fourth Quarter 2015 | 12 Mths to Date 2016 | 12 Mths to Date 2015 | 5 Year Average |
|---|---|---|---|---|---|
| Loss of Supply – Transmission | 0.63 | 2.10 | 11.06 | 9.63 | 6.69 |
| Loss of Supply – NF Power | 0.05 | 0.00 | 0.16 | 0.04 | 0.07 |
| Loss of Supply – Isolated | 0.25 | 0.03 | 0.42 | 0.25 | 0.29 |
| Loss of Supply – L'Anse au Loup | 0.00 | 0.03 | 0.02 | 0.14 | 0.08 |
| Distribution | 1.39 | 2.03 | 4.02 | 7.40 | 8.83 |
| Total | 2.32 | 4.19 | 15.68 | 17.46 | 15.96 |

Note: System Average Interruption Duration Index (SAIDI) is the average interruption duration per customer. It is calculated by dividing the number of customer-outage-hours (e.g. a two-hour outage affecting 50 customers equals 100 customer-outage-hours) by the total number of customers in an area.

**Rural Systems Service Continuity Performance by Type – 2016 Fourth Quarter Only**

| Area | Scheduled | | Unscheduled | | Total | |
|---|---|---|---|---|---|---|
| | SAIFI | SAIDI | SAIFI | SAIDI | SAIFI | SAIDI |
| **Central** | | | | | | |
| Interconnected | 0.03 | 0.14 | 1.06 | 2.71 | 1.09 | 2.85 |
| Isolated | 0.01 | 0.02 | 1.20 | 4.41 | 1.21 | 4.43 |
| **Northern** | | | | | | |
| Interconnected | 0.41 | 0.55 | 2.02 | 2.15 | 2.43 | 2.70 |
| Isolated | 0.14 | 0.06 | 0.81 | 2.39 | 0.95 | 2.46 |
| **Labrador** | | | | | | |
| Interconnected | 0.40 | 0.28 | 0.61 | 0.32 | 1.01 | 0.59 |
| Isolated | 0.34 | 0.20 | 1.27 | 5.73 | 1.60 | 5.93 |
| Total | 0.25 | 0.28 | 1.17 | 2.04 | 1.43 | 2.32 |

Note:
1. System Average Interruption Frequency Index (SAIFI) is the average number of interruptions per customer. It is calculated by dividing the number of customers that have experienced an outage by the total number of customers in an area.
2. System Average Interruption Duration Index (SAIDI) is the average interruption duration per customer. It is calculated by dividing the number of customer-outage-hours (e.g. a two-hour outage affecting 50 customers equals 100 customer-outage-hours) by the total number of customers in an area.

### 3.1.5 Reliability KPI: Other

**a) Under Frequency Load Shedding (UFLS)** - *reliability KPI that measures the number of events in which shedding of a customer load is required to counteract a generator trip. Customer loads are shed automatically depending upon the generation lost.*

There were three underfrequency events during the fourth quarter of 2016, summarized as follows:

***Event No. 1***

On December 08, 2016, at 1310 hours, Holyrood Unit 3 tripped. With the removal of generation (approximately 144 MW) the system frequency dropped to 58.50 Hz resulting in the activation of the under frequency protection at Newfoundland Power (12,381 customers) and Corner Brook Pulp & Paper Limited. Total island load at the time of the incident was 1294 MW. Hydro's Energy Control Center worked with

Newfoundland Power's operations group and all customers were restored within 6 minutes of the event occurring. **(315 MW-Mins)**

| | | |
|---|---|---|
| Load Shed: | Corner Brook Pulp and Paper | 15 MW |
| | Newfoundland Power | 40 MW |
| | Total Load Shed: | 55 MW |

At 1513 hours on December 08, 2016, Holyrood Unit 3 was returned to service. Investigation revealed that the outage was caused by tracking across the trip contact on the UST (Unit Service Transformer) oil temperature relay, which resulted in a Unit trip. After careful review, the failed output trip contact on the oil temperature relay was blocked and UST 3 and Unit 3 returned to service. The switch is scheduled to be replaced in 2017 during the unit's annual maintenance outage.

***Event No. 2***

On December 20, 2016, at 1805 hours the Holyrood Combustion Turbine tripped. With the removal of generation (approximately 70 MW) the system frequency dropped to 58.77 Hz resulting in the activation of the under frequency protection at Newfoundland Power (9,439 customers) and Corner Brook Pulp & Paper Limited. Total island load at the time of the incident was 1564 MW. Hydro's Energy Control Center worked with Newfoundland Power's operations group and all customers were restored within three minutes of the event occurring. **(201 MW-Mins)**

| | | |
|---|---|---|
| Load Shed: | Corner Brook Pulp and Paper | 15 MW |
| | Newfoundland Power | 42 MW |
| | Total Load Shed: | 57 MW |

Initial investigation revealed that the unit tripped on a "blade path temperature" alarm which occurred due to a faulty thermocouple reading. As this was a false indication, the

thermocouple was temporarily and safely bypassed which is permitted by the machine manufacturer. At 1954 hours on December 20, 2016 the Holyrood Combustion Turbine became available and was returned to service. Repairs were completed to the thermocouple circuit on December 21, 2016.

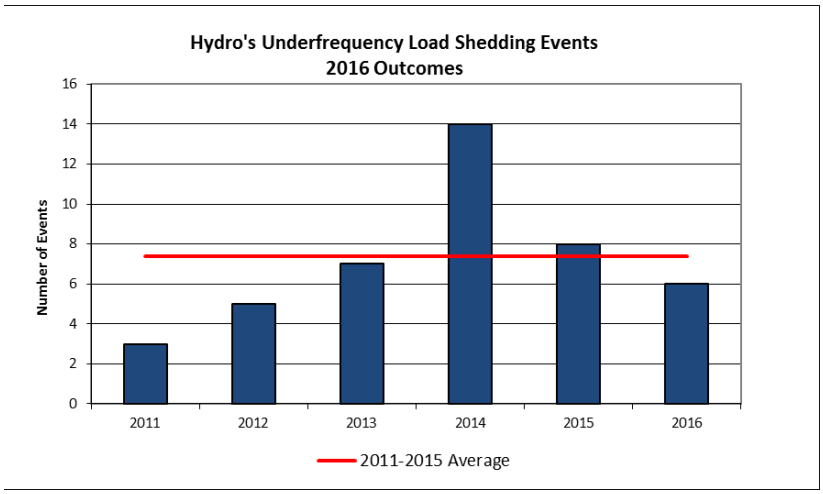
***Event No. 3***

On December 23, 2016, at 1032 hours the Holyrood Unit 1 tripped. With the removal of generation (approximately 110 MW) the system frequency dropped to 58.59 Hz resulting in the activation of the under frequency protection at Newfoundland Power (11,669 customers) and Corner Brook Pulp & Paper Limited. Total island load at the time of the incident was 1329 MW. Hydro's Energy Control Center gave notification to the Newfoundland Power control room within four minutes of the event to restore customers. All customers were restored within approximately nine minutes of the event occurring. **(444 MW-Mins)**

| | | |
|---|---|---|
| Load Shed: | Corner Brook Pulp and Paper | 15 MW |
| | Newfoundland Power | 41 MW |
| | Total Load Shed: | 56 MW |

Investigation into the trip revealed that an error occurred during the routine task of changing filters on the hydraulic system which resulted in an air bubble being trapped in the hydraulic line causing a momentary drop in pressure. All other systems were verified to be in good order and the unit was returned to service at 1111 hours on December 23, 2016. The incident was discussed with the Operator and it was determined that additional training is required for all shifts. This training will be completed in 2017.

In total, there were six UFLS events in 2016, compared to eight in 2015 and the five-year average (2011-2015) of 7.4 events. Refer to the graph below which compares the UFLS events over the past five years to this year’s performance.




1 The following table compares the UFLS events in the fourth quarter of 2016 to the same
2 quarter in 2015 in addition to the annual performance.

**Underfrequency Load Shedding Number of Events**

| Customers | Fourth Quarter 2016 | Fourth Quarter 2015 | 12 Mths to Date 2016 | 12 Mths to Date 2015 | 5 Year Average (2011–2015) |
|---|---|---|---|---|---|
| NF Power | 3 | 3 | 6 | 8 | 7.4 |
| Industrials | 3 | 2 | 4 | 6 | 2.0 |
| Hydro Rural* | 0 | 1 | 1 | 2 | 2.0 |
| Total Events | 3 | 3 | 6 | 8 | 7.4 |

**Underfrequency Load Shedding Unsupplied Energy (MW-min)**

| Customers | Fourth Quarter 2016 | Fourth Quarter 2015 | 12 Mths to Date 2016 | 12 Mths to Date 2015 | 5 Year Average (2011–2015) |
|---|---|---|---|---|---|
| NF Power | 735 | 831 | 2,304 | 2,245 | 5,096 |
| Industrials | 225 | 285 | 255 | 660 | 200 |
| Hydro Rural* | 0 | 30 | 12 | 72 | 110 |
| Total Events | 960 | 1,146 | 2,571 | 2,977 | 5,406 |

* Underfrequency activity affecting Hydro Rural Customers may also result in a number of delivery point outages. Outage frequency and duration are also included in totals shown in the delivery point statistics section of the report for these areas, namely the Connaigre Peninsula and Bonne Bay.

3 The details of the previous three UFLS events in 2016 are summarized in Appendix C3.

4 Refer to Appendix C4 for Other Significant Transmission System Disturbances.

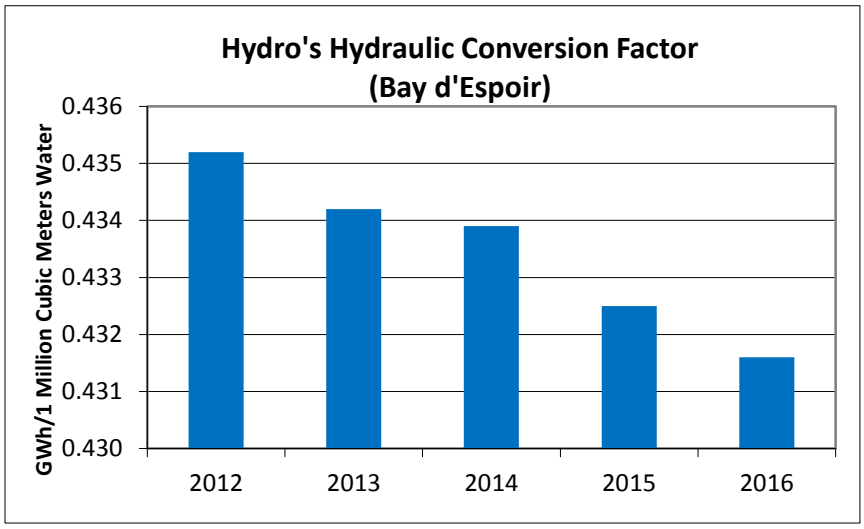
## 3.2 Operating Performance Indicators

This section presents information on two indicators of operating performance, both of which are associated with generation.

### 3.2.1 Operating KPI: Generation

**a) Hydraulic Conversion Factor (Bay d'Espoir)** - *a representative performance KPI for the principal hydroelectric generation assets located at Bay d'Espoir. This KPI tracks the efficiency in converting water to energy and it is calculated as the ratio of Net GWh generated for every one million cubic metres (MCM) of water consumed.*

In 2016, the hydraulic conversion factor for Bay d'Espoir was 0.432 GWh/MCM, compared to a 2016 target of 0.433 GWh/MCM.




In 2016, the inflows were 114% above average and there was a 155% increase in spillage in the Bay d'Espoir reservoir system from 2015. This was largely due to the extreme precipitation event on October 10 and 11 (Hurricane Matthew) which greatly affected the Bay d'Espoir system. The October inflows were 230% of average inflows for October. These high reservoirs levels affected water utilization at the Bay d'Espoir plant and this contributed to a lower conversion factor than previous years.

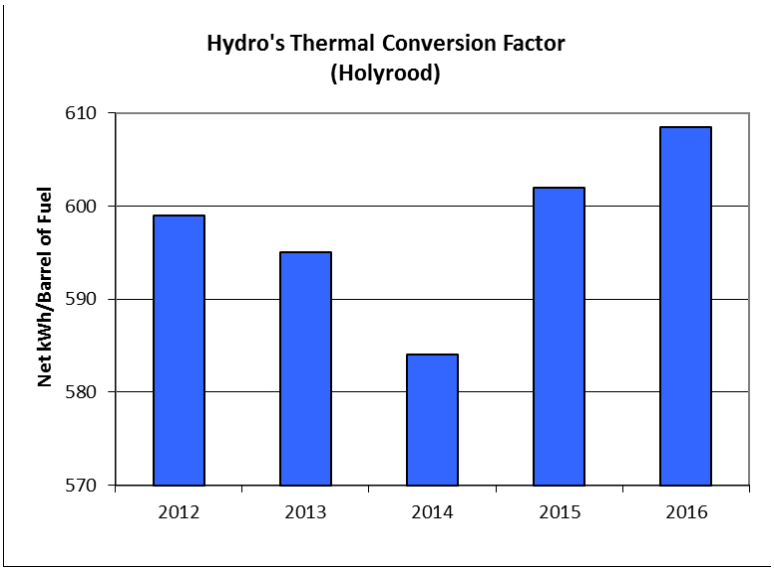
**b) Thermal Conversion Factor -** *a representative performance KPI for the oil-fired thermal generation assets located at Holyrood. This KPI tracks the efficiency in converting heavy fuel oil into electrical energy and is measured as the ratio of the net kWhs generated to the number of barrels of No. 6 fuel oil consumed.*

The thermal conversion factor for Holyrood is proportional to the output level of the three units, with higher averages and sustained loadings resulting in higher conversion factors. The output level of the Holyrood Thermal Generating Station will vary depending on hydraulic production on the Island, quantity of power purchases, customer energy requirements and system security requirements. The thermal conversion factor is also impacted by the heating content in the No. 6 fuel consumed at the plant, measured in BTUs/bbl.

In 2016, Hydro's net thermal conversion factor was 608 kWh per barrel compared to 602 kWh per barrel in 2015 and the 2016 target of 607 kWh per barrel. The efficiency at the Holyrood plant has remained relatively consistent with a net heat rate performance of 10,600 BTU/kWh in 2016 compared to 10,518 BTU/kWh in 2015.

In 2016, the units were dispatched as required for Avalon transmission support and system peak load considerations. The average net unit load, while operating, was 90.8 MW, up from 88.9 MW in 2015, but lower than the budget of 106 MW for 2016.

Energy production from the Holyrood Generating Station for 2016 was 1,621 GWh, an 11% increase from 2015 production levels. This is primarily due to the requirement to support the reservoirs in the first half of the year which helped to offset hydroelectric generation. Holyrood production, although higher than in 2015, was lower than planned during the winter months due to unit issues.




## 3.3 Financial Performance Indicators

The financial KPIs reported annually to the Board are:

1. Corporate operating, maintenance and administrative expense (OM&A) per MWh delivered;
2. Generation OM&A per MW installed capacity;
3. Generation OM&A per GWh generated;
4. Transmission OM&A per transmission circuit km; and
5. Distribution OM&A per distribution circuit km.[10]

In Order No. P.U. 8(2007), the Board ordered that Hydro file a report no later than October 31, 2007 outlining an appropriate peer group with which Hydro's financial performance at the generation and transmission levels could be compared.[11] In

[10] This KPI is not available for benchmarking from 2007 onwards. It will continue to be reported for Hydro for annual comparison purposes. Please see section 3.3.4 a) Distribution Controllable Cost for a discussion of the alternate KPI to be used for peer benchmarking.

[11] In 2007, Hydro had initially used peer benchmarking data from the Canadian Electricity Association (CEA) Committee on Performance Excellence (COPE), as published in the "Peer Group Performance Measures for Newfoundland Power" report. Since then the CEA has advised that neither the composite information for these measures nor any other cost-related CEA composite indicators are available for benchmarking purposes. As a result, Newfoundland Power reports based on a peer group of companies operating in the United States. This group of companies is not an appropriate group for Hydro to use as a peer group of companies due to Hydro's relatively small distribution component; however, in order to maintain consistency for year-over-year comparisons, Hydro uses this group of companies for the Corporate Controllable Unit KPI that Hydro uses for its generation financial benchmarking.

compliance with Board Order No. P.U. 8(2007), Hydro filed a report titled "Peer Group Benchmarking" dated October 31, 2007 which summarized Hydro's findings regarding development of a peer group for financial KPIs related to generation and transmission. In that report, Hydro identified separate peer groups for generation KPIs and transmission KPIs and proposed that, subject to data availability, the selected peers remain constant to allow for meaningful trend comparisons over time. This is the ninth year of reporting generation and transmission financial KPI peer data. The list of peers used for KPI benchmarking for Financial Performance Indicators is included as Appendix D. This peer group benchmarking data is sourced from the U.S. Federal Energy Regulatory Commission (FERC) database, to which Hydro has a subscription. All financial data for the United States-based peer group is in US dollars and all financial data for Hydro is in Canadian dollars.

Hydro has historically provided OM&A figures on a forecast basis; however, in accordance with the Settlement Agreement which was approved in Board Order No. P.U. 49(2016), Hydro has reported 2016 OM&A based on the 2015 Test Year Cost of Service Study included in its January 27, 2017 Compliance Application.

### 3.3.1 Financial KPI: Corporate Operating, Maintenance and Administrative Expense (OM&A) per MWh delivered

---

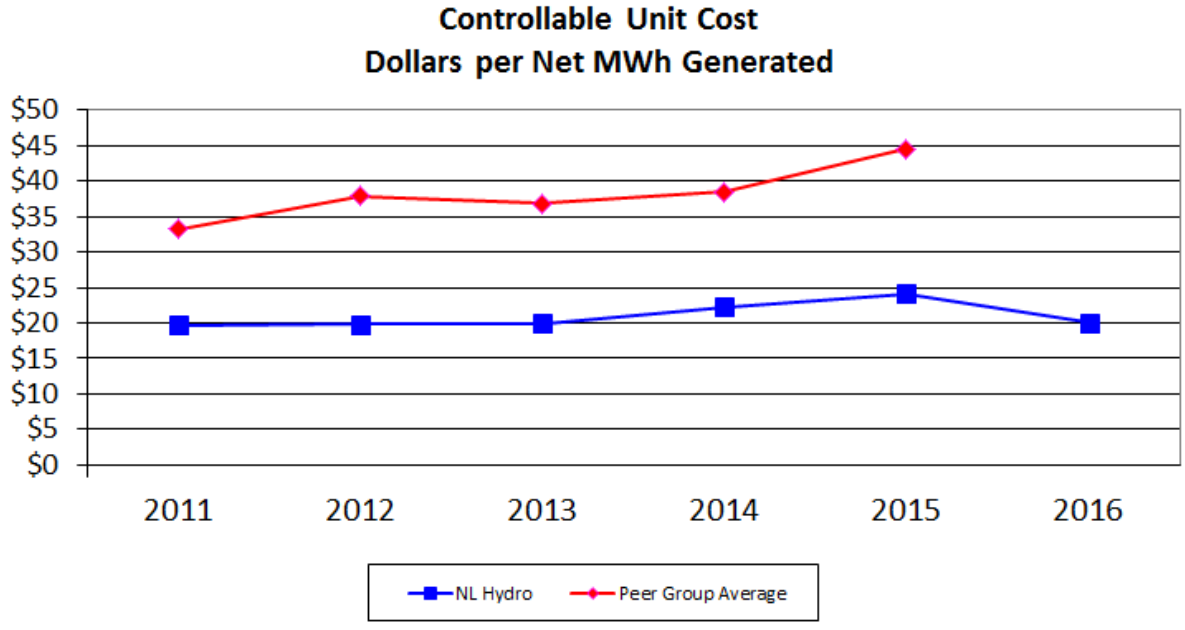
**Controllable Unit Cost** - *a high level corporate KPI that tracks Hydro's OM&A expenses in relation to its total energy delivered, expressed as dollars per MW hour. Total Corporate OM&A includes all operating labour and materials for Hydro's generation, transmission, distribution, customer-related and administrative costs, and loss on disposal of capital assets. Energy deliveries have been normalized for weather, customer hydrology, and industrial strikes.*

---

Hydro's OM&A costs decreased from $153.8 million in 2015 to $123.9 million in 2016, resulting in a Controllable Unit Cost of $13.39 per MWh delivered for 2016.

Hydro uses normalized energy delivered in the computation of its Corporate Controllable Unit Cost. This is not directly comparable to the peer group data from the FERC database, which is based on net energy generated. In order to provide for direct comparison with the peer group, Hydro has also calculated Controllable Unit Cost based on net energy generated. The chart below illustrates Hydro's Corporate Controllable Unit Cost for 2011 to 2016 and that of the peer group for 2011 – 2015.[12] As indicated, Hydro's Corporate OM&A per unit of net generation was $20.07 per MWh during 2016. This is higher than the computed Controllable Unit Cost of $13.39 per MWh delivered as normalized deliveries are higher than net generation due to the effect of Hydro's energy purchases.

Hydro's Corporate Controllable Unit Cost has decreased from 2015. From 2011 to 2015, Hydro's Controllable Unit Cost generally follows a similar trend as that of its peer group. As Hydro has no insight into the operations and finances of the peer group companies, it cannot determine what factors drive their individual Controllable Unit Costs.



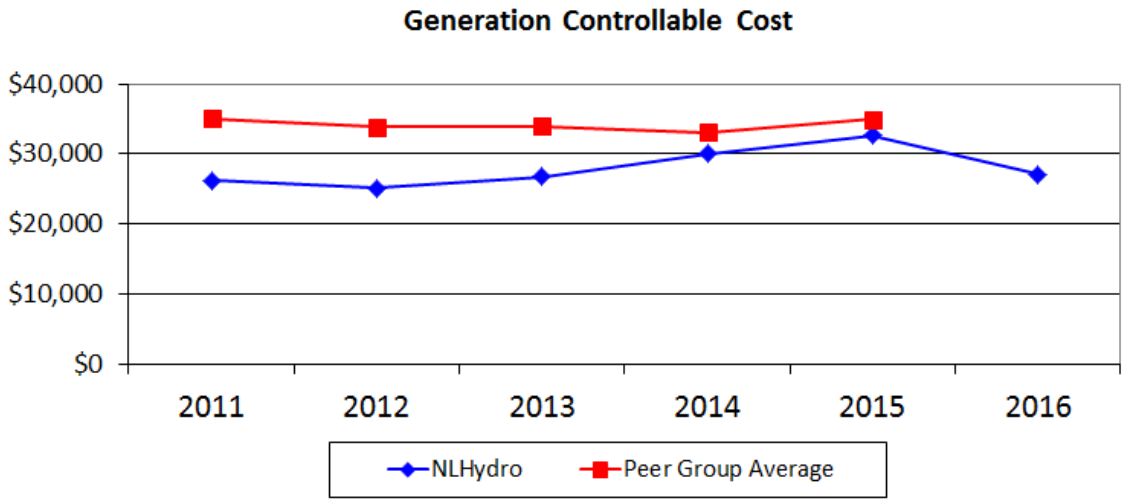

[12] Peer data for 2016 is not available at this time.

### 3.3.2 Financial KPI: Generation OM&A per MW Installed Capacity

**Generation Controllable Cost** - *a functional corporate KPI that tracks Hydro's generation costs in relation to its installed generation. It is computed by dividing generation OM&A by installed capacity as measured in MW.*

Generation Controllable Cost was $27,095 per MW for 2016 compared with $32,599 in 2015, which is a decrease of $5,503 per MW.

The peer group used to benchmark Generation Controllable Costs has generally maintained its costs between 2011 and 2015, while Hydro's Generation Controllable Cost have fluctuated, decreasing from 2011 to 2012, increasing from 2012 to 2015, and decreasing again in 2016.

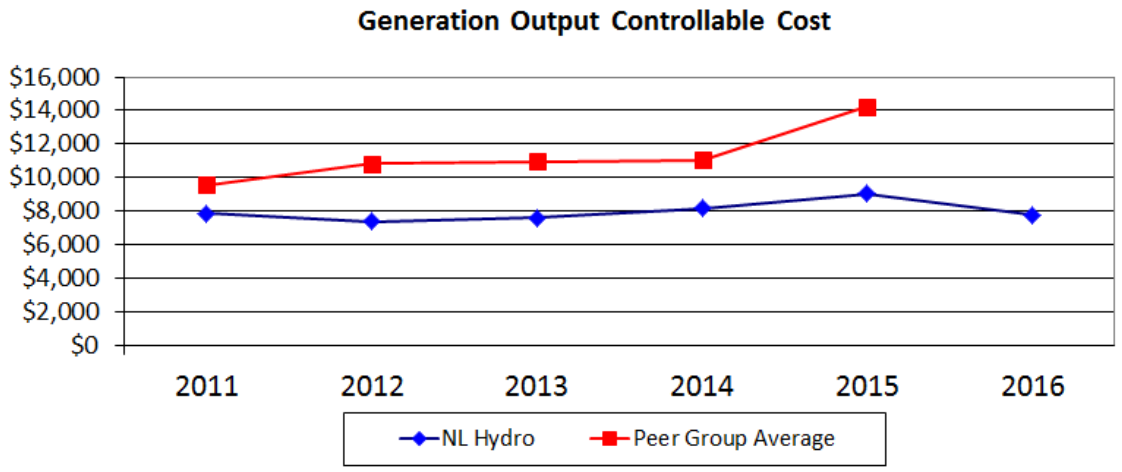



### 3.3.3 Generation OM&A per GWh generated

**Generation Output Controllable Cost** - a functional corporate KPI that tracks Hydro's generation OM&A expenses in relation to its net generation measured in GWh.

In 2016, Hydro's Generation Output Controllable Cost of $7,738 per GWh, compared to $9,010 in 2015, which is a decrease of $1,272 per GWh.

Hydro's Generation Output Controllable Cost has followed a similar trend to that of the peer group over the past five years, although the peer group experienced a bigger relative increase in 2015 than Hydro experienced.

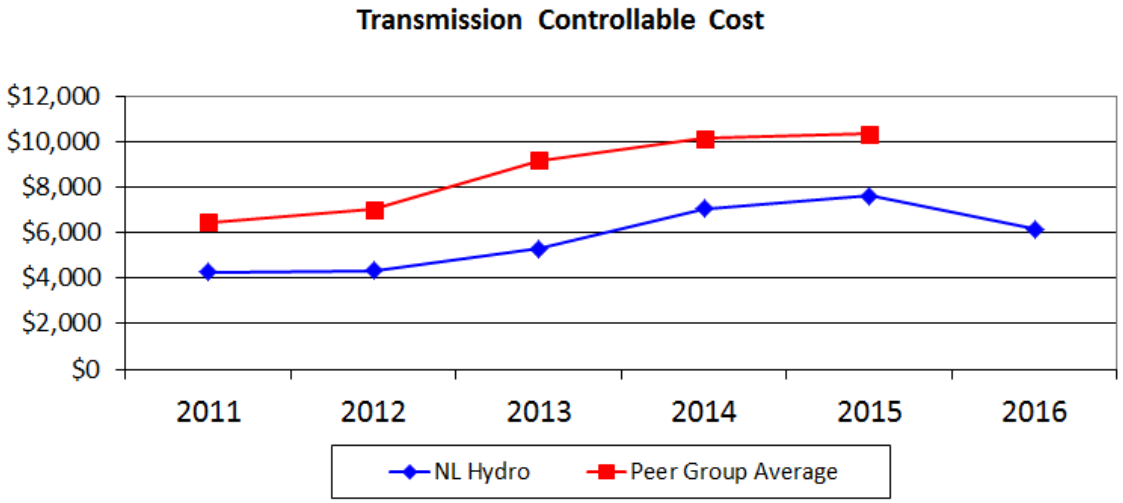



### 3.3.4 Financial KPI: Transmission OM&A per Transmission Circuit km

**Transmission Controllable Cost** - *a KPI that tracks Hydro's transmission OM&A expenses in relation to the 230 kV equivalent length of its transmission circuits (69 kV lines and above).*

In 2016, Hydro's Transmission Controllable Cost of $6,148 per km of transmission was lower than the $7,615 in 2015, which is a decrease of an increase of $1,467 per km.

Hydro's costs per km of transmission circuit from 2011 to 2015 have trended in a similar pattern as the peer group. While a comparison of direct cost per unit km between the peer group and Hydro is not meaningful due to differences in accounting treatment and corporate cost allocations, tracking trends over several years could be helpful in ensuring consistency with the industry in general.




### 3.3.5 Financial KPI: Distribution OM&A per Distribution Circuit km

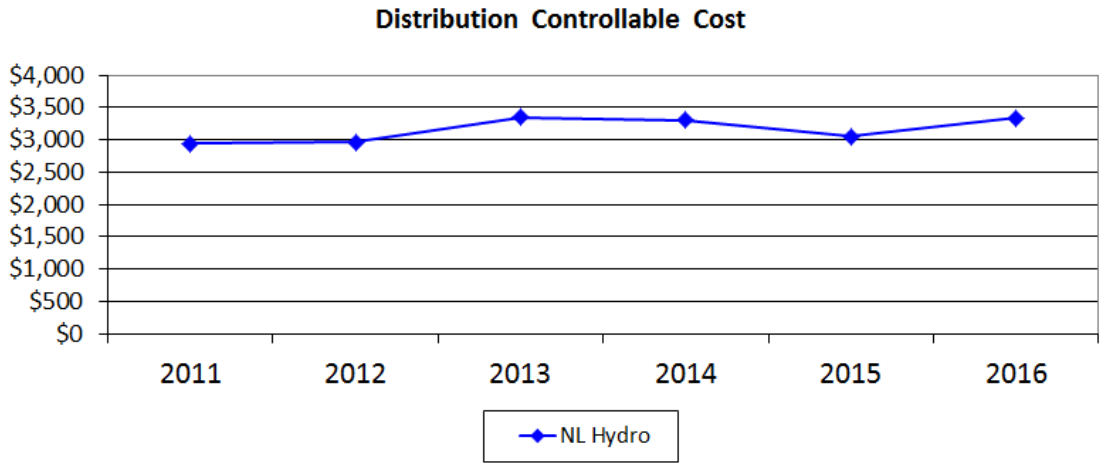
**Distribution Controllable Cost** - *a functional corporate KPI that tracks Hydro's distribution OM&A expenses in relation to the length of its equivalent 230 kV distribution circuits in kilometers.*[13]

The Distribution Controllable Cost KPI had previously been reported as dollars per km of distribution using the CEA COPE data. As discussed, the CEA COPE data is no longer available for benchmarking of financial KPIs. Additionally, although distribution cost data is available for the U.S.-based peer group used by Hydro for Transmission Controllable Cost, the associated km of distribution data is unavailable. In the absence of the CEA COPE data, Newfoundland Power has chosen to use a KPI that divides total Distribution OM&A by MWh of retail sales. Hydro will therefore use this same data set. However, given Hydro's relatively small quantity of retail sales, combined with the rural and remote locations of these sales, it is expected that Hydro's Distribution cost per MWh will be significantly higher than Newfoundland Power's and the peer group average.

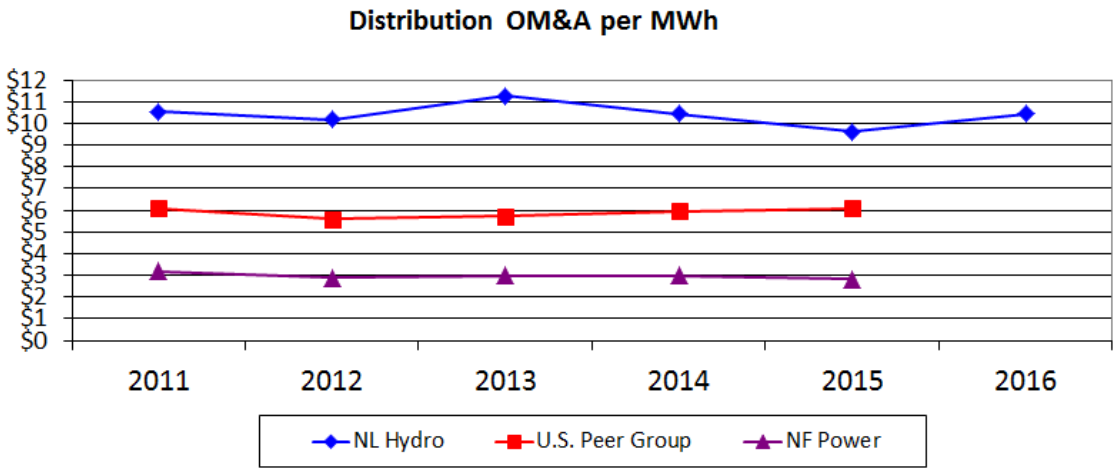
[13] CEA COPE peer data used up to 2007 excluded circuits less than 1 kV. Hydro's data has also been adjusted to exclude circuits less than 1 kV from 2003 onward.

The distribution cost per km of circuit length will continue to be reported for year-over-year trend analysis.

At $3,338 per circuit km in 2016, Hydro's Distribution Controllable Cost increased $285 per km from $3,053 per km in 2015.




As expected, Hydro's distribution costs of $9.61 in 2015 trend higher than those of the peer group, as demonstrated in the chart below. The distribution systems are a relatively small component of Hydro's total plant compared to generation and transmission plant and also compared to Newfoundland Power's distribution assets. Thus, Hydro's higher costs per MWh are likely due to the rural and geographically dispersed nature of its distribution systems and the resultant inability to achieve cost economies.




## 3.4 Customer-Related Performance Indicators

**a) Residential Customer Satisfaction** - *an indicator of Hydro's residential customers overall satisfaction level with service, which is tracked by the Percent Satisfied Customers KPI.*[14]

The Percent Satisfied Customers measure is also a corporate performance KPI that tracks the satisfaction of rural residential customers with Hydro's performance. The Percent Satisfied Customers measure is produced via regular surveys of Hydro's residential customers.

The 2016 residential customer satisfaction survey shows that 90% of customers are either very satisfied or somewhat satisfied with Hydro. When compared to 2014, customer satisfaction has increased by 6%.

[14] As of 2009, the Customer Satisfaction index (CSI) is no longer being calculated as a Customer-Related Performance Indicator.

Residential Customer Satisfaction
Overall Customer Satisfaction
94
92
90
88
86
84
82
80
78
76
74
2006
2007
2008
2009
2010
2011
2012
2014
2016

# *Appendices*

## Appendix A: Rationale for Hydro's 2016 KPI Targets

| KPI | Comment on KPI 2016 Target |
|---|---|
| Reliability | Hydro has adopted a target setting approach wherein known factors that affect reliability performance are incorporated into the target setting process wherever practical. This approach also uses percentage improvements and past performance levels to set target levels for continuous improvements. |
| Weighted Capability Factor | The 2016 target is set using the expected annual generation unit outage schedule combined with performance improvements relative to recent history. |
| Weighted DAFOR | The 2016 target is set using the expected annual generation unit outage schedule combined with performance improvements relative to recent history. |
| Transmission SAIDI, SAIFI, and SARI | The 2016 targets for forced outage performance were not set. |
| Distribution SAIDI & SAIFI | Improvements relative to the most recent five-year average. |
| Underfrequency Load Shedding | The 2016 target is based upon improvement over the most recent five-year average. |
| **Operating** | |
| Hydraulic Conversion Factor | Hold at the previous target value. |
| Thermal Conversion Factor | 2016 target was 607 kWh/bbl. |
| **Other** | |
| Customer Satisfaction | The target for residential customers in 2016 was 80%. |

## Appendix B: Computation of Weighted Capability Factor and Factors Impacting Performance

Weighted Capability Factor is calculated using the following formula:

$$1 - \frac{\sum_{all\ units}\left(\frac{unit\ total\ equivalent\ outage\ time \times unit\ MCR}{unit\ hours}\right)}{\sum_{all\ units} unit\ MCR}$$

Where,

**MCR** = Maximum Continuous Rating, the gross maximum electrical output, measured in megawatts, for which a generating unit has been designed and/or has been shown capable of producing continuously. MCR would only change if the generating capability of a unit is permanently altered by virtue of equipment age, regulation, or capital modifications. Such changes to MCR are infrequent and have not actually taken place within Hydro since the 1980's when two units at Holyrood were uprated due to modifications made to these units.

**Unit hours** = the sum of hours that a unit is in commercial service. This measure includes time that a unit is operating, shut down, on maintenance, or operating under some form of derating. Unit hours will only be altered in the infrequent event that a unit is removed from commercial service for an extended period of time.

**Unit total equivalent outage time** = the period of time a unit is wholly or partially unavailable to generate at its MCR. For the purposes of calculating outage time, the degree to which a unit is derated is converted to an outage equivalency. Thus, a unit that is able to generate at 75% load for four days would have an equivalent outage time

of one full day out of four. Factors that can affect unit total equivalent outage time are classified by CEA under nine categories, which are outlined in Appendix A to this Report. Hydro tracks the time that each unit spends in each of these nine states and calculates the weighted capability accordingly.

Unit total equivalent outage time is the measure that is most likely to impact Weighted Capability Factor on a year-to-year basis, since MCR and unit hours are unlikely to change.

**Factors that Affect Unit Total Equivalent Outage Time**

1. **Sudden Forced Outage.** An occurrence wherein a unit trips or becomes immediately unavailable.
2. **Immediately Deferrable Forced Outage**. An occurrence wherein a unit must be made unavailable within a very short time (10 minutes).
3. **Deferrable Forced Outage**. An occurrence or condition wherein a unit must be made unavailable within the next week.
4. **Starting Failure**. A condition wherein a unit is unable to start.
5. **Planned Outage**. A condition where a unit is unavailable because it is on its annual inspection and maintenance.
6. **Maintenance Outage**. A condition where a unit is unavailable due to repair work. Maintenance outage time covers outages that can be deferred longer than a week, but cannot wait until the next annual planned maintenance period.
7. **Forced Derating**. A condition that limits the usable capacity of a unit to something less than MCR. The derating is forced in nature, typically because of the breakdown of a subsystem on the unit.
8. **Scheduled Derating**. A condition that limits the usable capacity of a unit to something less than MCR, but is done by virtue of the decision of the unit operator. Scheduled deratings are less common than forced deratings, but can

arise, for example, when a unit at Holyrood is de-rated to remove a pump from service.

9. **Common Mode Outages**. Common mode outages are rare, and arise when an event causes multiple units to become unavailable. An example might be the operation of multiple circuit breakers in a switchyard at Holyrood due to a lightning strike, rendering up to three units unavailable.

Note: There are hundreds of CEA equipment codes for generator subsystems that track the cause for the time spent in each of the above categories.

## Appendix C1: Significant Transmission Events – 2016

There were nine significant events in 2016. The details follow:

***Event 1***

On January 13, all customers north of Sally's Cove on the Great Northern Peninsula experienced unplanned power outages of up to three hours and 16 minutes. The outage occurred after transformer T1 tripped at the Berry Hill Terminal Station. The transformer was isolated and all customers were restored in stages. Refer to the following table for customer outage details:

**(Unsupplied Energy: 2,830 MW-Mins)**

**Event -BHL T1 trip - Jan 13, 2016**

| Delivery Point Affected | Start Time | Time of Restoration | Outage Duration (mins) | Load Loss (MW) | MW-Mins |
|---|---|---|---|---|---|
| Cow Head | 16:32 | 17:44 | 72 | 1.6 | 115.2 |
| Parson's Pond | 16:32 | 17:40 | 68 | 0.2 | 13.6 |
| Daniel's Harbour | 16:32 | 17:40 | 68 | 0.8 | 54.4 |
| Hawkes's Bay | 16:32 | 18:33 | 122 | 5.7 | 586.3 |
| Plum Point | 16:32 | 17:42 | 70 | 3.5 | 245 |
| Bear Cove | 16:32 | 17:43 | 71 | 4.9 | 347.9 |
| Main Brook | 16:32 | 17:46 | 74 | 0.6 | 44.4 |
| Roddickton | 16:32 | 17:46 | 74 | 2.3 | 170.2 |
| St Anthony | 16:32 | 18:48 | 136 | 9.7 | 1252.7 |

**Event 2**

On February 4th, industrial customers Vale and Praxair at the Voisey's Bay Nickel Terminal Station experienced a load loss during switching to remove transformer T1 from service. A customer outage was required to switch loads between transformers T1 and T2. A problem was found with a burnt current transformer block in the transformer cabinet which required T1 to be removed from service immediately. Vale and Praxair reduced their loading for approximately two hours by 10 MW during this event. Repairs have been completed and T1 was energized with no load. (**Unsupplied Energy: 1,434 MW-Mins)**

***Event 3***

On March 22, all customers (7833) supplied by transmission line TL259 (including Parsons Pond, Daniels Harbour, Peter's Barren, Hawkes Bay, Plum Point, Bear Cove, St. Anthony Airport, St. Anthony Diesel, Main Brook, and Roddickton Terminal Stations) experienced an unplanned power outage when TL259 tripped. All customers were restored via transmission line TL227, Hawke's Bay diesel plant, and St. Anthony diesel plant. The cause of the outage was a downed conductor on A Phase of TL259 due to an eye bolt failure on structure 109. Excessive wind in the area is believed to be the root cause. **(Unsupplied Energy: 3,477 MW-Mins)**

**Event -BHL TL259 trip - March 22, 2016**

| Delivery Point Affected | Start Time | Time of Restoration | Number of Customers | Outage Duration (mins) | Load Loss (MW) | MW-Mins |
|---|---|---|---|---|---|---|
| Cow Head | 23:23 | 23:24 | 468 | 1 | 1.4 | 1.4 |
| Parson's Pond | 23:09 | 23:29 | 270 | 20 | 0.6 | 12 |
| Daniel's Harbour | 23:09 | 23:29 | 289 | 20 | 0.8 | 16 |
| Hawkes's Bay (1) | 23:09 | 23:29 | 1317 | 20 | 4.7 | 94 |
| Hawkes's Bay (2) | 1:42 | 1:52 | 1317 | 10 | 4.7 | 47 |
| Plum Point | 23:09 | 1:42 | 969 | 153 | 2.8 | 428.4 |
| Bear Cove L4, L6(partial) | 23:09 | 1:43 | 700 | 154 | 3.1 | 477.4 |
| Bear Cove L6(partial) | 23:09 | 5:27 | 244 | 378 | 1.1 | 415.8 |
| Main Brook | 23:09 | 1:59 | 249 | 170 | 0.8 | 136 |
| Roddickton | 23:09 | 1:59 | 910 | 170 | 3.1 | 527 |
| St Anthony | 23:09 | 0:55 | 2418 | 106 | 7.2 | 1370.8 |

***Event 4***

On May 20, all (1,763) customers supplied by the Bottom Waters Terminal Station experienced a planned outage of three hours and 44 minutes (224 mins). Bottom Waters transformer T1 locked out due to condensation on the winding temperature relay. This caused a short resulting in a contact closure and trip into the transformer lockout.

(Unsupplied Energy: 1,183 MW-Mins)

***Event 5***

On May 23, Customers served by transmission Line TL220 and the Conne River, English Harbour West, and Barachoix Distribution Systems, (2,606 customers) experienced an unplanned outage, see outage details below. A forest fire started under TL220 resulted

into a phase to phase fault that resulted in the failure of a low side (25 kV) lightning arrester on transformer T1 at Barachoix Terminal Station. The recloser supplying Gaultois had opened and had to be closed locally.

- Outage 1: Areas: Conne River and English Harbour West Distribution Systems
  Duration: 1054 to 1322 hours (May 23, 2016), 2 hours 28 minutes
  Customers: 1,226, Belleoram, English Harbour West, Pool's Cove, Rencontre East, Conne River
- Outage 2: Areas: Barachoix Distribution System (not including Gaultois)
  Duration: 1054 hours (May 23, 2016) to 0100 hours (May 24, 2016), 14 hours 6 minutes
  Customers: 1,490, Hermitage, Harbour Breton, Seal Cove (F. B.)
- Outage 3: Gaultois
  Duration: 1054 hours (May 23, 2016) to 0656 hours (May 24, 2016), 20 hours 2 minutes
  Customers: 109
  (**Unsupplied Energy: 3,319 MW-Mins)**

***Event 6***

On July 29, customers supplied by the St. Anthony Diesel Plant Terminal Station experienced an unplanned power outage ranging from 31 minutes to seven hours and 49 minutes. The outage occurred after lighting hit transmission line TL261 (confirmed by LTS). Circuit breaker B1L61 failed to close due a problem with the air compressor which is required to operate the closing mechanism. The fuse blown to the compressor motor. The St. Anthony Diesel Plant was used to supply customers supplied on feeders L2 and L3 while customer on L1 experienced an outage for the total duration of outage. The following outlines the customer outage information:
(Unsupplied Energy: 1,751MW-Mins)

**Outage 1 - Event -STA TL261 Trip - July 29, 2016**

| Delivery Point Affected | Start Time | Time of Restoration | Number of Customers | Outage Duration (mins) | Load Loss (MW) | MW-Mins |
|---|---|---|---|---|---|---|
| St Anthony L1 | 5:02 | 12:51 | 1181 | 469 | 2.4 | 1145.3 |
| St Anthony L2 | 5:02 | 8:27 | 456 | 205 | 0.9 | 193.3 |
| St Anthony L3 | 5:02 | 8:01 | 781 | 179 | 1.6 | 289.1 |
| St Anthony total | 5:02 | 12:51 | 2418 | 469 | 5.0 | 1627.7 |

**Outage 2 - Event -STA TL261 Trip - July 29, 2016**

| Delivery Point Affected | Start Time | Time of Restoration | Number of Customers | Outage Duration (mins) | Load Loss (MW) | MW-Mins |
|---|---|---|---|---|---|---|
| St Anthony L2 | 10:09 | 10:40 | 456 | 31 | 0.9 | 29.2 |
| St Anthony L3 | 10:09 | 11:07 | 781 | 58 | 1.6 | 93.7 |

***Event 7***

On September 12, customers supplied by the Happy Valley (5,166) Terminal Station experienced an unplanned power outage of four hours and ten minutes. The trip occurred after L1301 tripped at the Churchill Falls Switchyard due to a damaged post insulator on disconnect switch B1T32. Attempts to start the gas turbine at Happy Valley failed. (Unsupplied Energy: 5,350 MW-Mins)

***Event 8***

On November 21, NP customers (13,135) supplied by Sunnyside Terminal Station and transmission line TL219, experienced an unplanned power outage of three hours and 34 minutes (214 mins). NP restored some customers with the Greenhill gas turbine and the remaining customers were restored with TL219. TL219 tripped due to two lightning strikes, the second strike resulted in the operation of the breaker failure protection on circuit Breaker B3L19. (Unsupplied Energy: 3,896 MW-Mins)

***Event 9***

On December 16, NP customers supplied by transmission line TL215 in the Port Aux Basque area (3,563) experienced an unplanned power outage of 12 hours and 40 minutes. The outage continued for NP customers due to distribution damage. Outage

was caused by the failure of a crossarm pin due to extreme high winds in the area.

(Unsupplied Energy: 7,650 MW-Mins)

## Appendix C2: Significant Distribution Events – 2016 (Excluding Fourth Quarter)

On January 1, 2016 at 0310 hours, 552 customers serviced by the Bottom Waters Terminal Station - Line 2 experienced an unplanned power outage. The communities affected included Burlington, Middle Arm, Smith's Harbour, Nipper's Harbour and the Rambler Mine site. The outage was caused by a downed primary and neutral conductor between Nugget Pond tap and Nippers Harbour. Hydro crews responded and all customers were restored by 1545 hours.

On January 13, 2016 at 1540 hours, all customers (142) in Conche, served by the Roddickton distribution system, experienced an unplanned power outage. The outage was caused by a broken pole in the distribution system. Crews travelled to area on January 13 but could not assess the trouble due to the poor weather (snow and high winds). The issue was discovered during a morning patrol the next day. Customers were restored at 1030 hours, January 14 following completion of repairs.

On February 07, 2016 at 0900 hours, 58 customers in Happy Valley Goose Bay, Labrador supplied by Feeder 11, experienced a planned power outage. The outage was required to safely replace equipment at the terminal station. The planned work was completed and the feeder was restored at 1415 hours on February 07, 2016.

On February 13, 2016 starting at 0800, there was a planned outage affecting 400 customers in Sheshatshiu supplied by distribution line, L7. The outage was required to safely perform upgrades to the distribution system. All customers were restored at 1030 hours.

On February 15, 2016, at 0240 hours, all customers (800) serviced by the English Harbour West Terminal Station, including the communities of Boxey, Belleoram, Coombs Cove, English Harbour West, Mose Ambrose, Pools Cove, Rencontre East, St.

Jacques, and Wreck Cove experienced an unplanned power outage due to a downed conductor. At 0939 hours restorations were underway when recloser EH1-R2 tripped resulting in customer outages to Belleoram, St. Jacques, English Harbour West, Mose Ambrose, Wreck Cove, Boxey and Coombs Cove. The cause was determined to be a floating phase.

Repairs were made and customer restoration occurred as follows:

- 220 customers at Rencontre East and Pools Cove, 0240 to 0910 hours, 6 hour 30 minutes.
- 580 customers at Belleoram, St. Jacques, English Harbour West, Mose Ambrose, Wreck Cove, Boxey and Coombs Cove, 0240 to 1300 hours, 10 hours 20 minutes.

On February 16, 2016 at 1433 hours, 1110 customers in Happy Valley Goose Bay, Labrador supplied by Lines 8, 9, 10, 15, 16, and 17 experienced a planned power outage. The outage was required to safely replace equipment at the terminal station. The planned work was completed and all customers were restored by 1641 hours on February 16, 2016.

On March 16, 2016 at 1106 hours, all customers (98) in Black Tickle experienced an unplanned power outage. The outage occurred when a recloser failed to operate due to a faulted controller. All customers were restored at 1810 hours after a temporary repair was made. Hydro completed permanent repairs on March 17.

On March 23, 2016 at 1735 hours, all customers (105) in Goose Cove experienced an unplanned power outage. The outage occurred due to severe weather in the area causing issues with the distribution system. Hydro crews were delayed in making repairs due to unsafe working conditions caused by the weather. All customers were restored at 1242 hours, March, 24, 2016.

On March 27, 2016 between 0027 and 0654 hours, all customers (1317) serviced by transmission line TL221 experienced twenty five unplanned power outages when the line opened and reclosed due to ice bridging and contamination on the insulators of TL221. The total duration of these outages was 4 seconds for each occurrence.

On March 29, 2016 at 1738 hours, 374 customers serviced by the Bottom Waters Terminal Station - Line 1 experienced an unplanned power outage. The communities affected included Woodstock, Pacquet, and Mings Bight along with Rambler and Anaconda mine sites. The outage was caused by a floating phase resulting from a failed insulator string. Repairs were made and all customers were restored at 2120 hours.

On April 3, 2016 at 1045 hours, 374 customers serviced by the Bottom Waters Terminal Station - Line 1 experienced an unplanned power outage. The communities affected included Woodstock, Pacquet, and Ming's Bight along with Rambler and Anaconda mine sites. The outage was caused by a floating phase resulting from a failed insulator string. Repairs were made and all customers were restored at 1400 hours.

On April 4, 2016 at 1605 hours, 542 customers serviced by the Bottom Waters Terminal Station - Line 2 experienced an unplanned power outage. The communities affected included Nipper's Harbour, Kings Harbour, Smiths Harbour, Burlington, and Middle Arm along with Rambler Mines. The outage was caused by a downed tree on the distribution line. At the time, there were extreme wind warnings in effect. Hydro responded, made the necessary repairs and returned service to customers.

<u>Outage Details</u>

Outage 1: Nipper's Harbour and Ramble Mines, 1605 – 1845 hours, 2 hours 40 minutes, 87 customers.

Outage 2: Kings Harbour, Smiths Harbour, Burlington, and Middle Arm, 1605 – 2030 hours, 4 hours, 25 minutes, 455 customers.

On May 15, 2016 at 0600 hours, 1320 customers in Happy Valley Goose Bay, Labrador supplied by the Happy Valley Terminal Station, experienced a planned power outage. The outage was required to safely install a distribution pole on Feeder 8 as well as to make repairs to equipment in the distribution system. The line repair was completed and all customers were restored by 1150 hours. The breakdown of the 1320 customers affected by this outage is as follows:

***Feeder 7***

0600 to 0710 Hours (870 Customers – 1 hour, 10 mins)

***Feeder 8***

0900 to 1150 Hours (450 Customers – 2 hours, 50 mins)

On June 04, 2016 at 0800 hours, 93 customers in Happy Valley Goose Bay, Labrador supplied by the Happy Valley Terminal Station, Feeder L4 (partial), experienced a planned power outage to accommodate feeder upgrades. All customers were restored by 1130 hours upon completion of planned work.

On June 11, 2016 at 0700 hours (Labrador time), 650 customers in Labrador City, Labrador, serviced by Quartzite Line 11 experienced a planned power outage. The outage was required to safely tie in a midspan pole on the distribution system. All customers were restored at 0750 hours.

On June 14, 2016 at 1300 hours (Labrador time), 281 customers in Wabush, Labrador, serviced by distribution line 3 experienced a planned power outage. The outage was

required to safely perform maintenance to the distribution system. All customers were restored at 1700 hours.

On July 9, 2016 at 1300 hours (Labrador time), 450 customers in Wabush, Labrador, serviced by distribution line 12 experienced a planned power outage. The outage was required to safely replace insulators on the distribution line. All customers were restored at 1745 hours.

On July 24, 2016 at 0900 hours (Labrador time), 138 customers in Wabush, Labrador, serviced by distribution line 11 experienced a planned power outage. The outage was required to safely connect a new distribution pole and to replace insulators. All customers were restored on July 24, 2016 at 1215 hours.

On August 05, 2016 at 1700 hours (Labrador time), 1357 customers in Labrador City, Labrador, serviced by the Quartzite Substation Lines 08, 09, 10 and 11 experienced an unplanned power outage due to a lightning strike. All customers were restored at 1745 hours, August 05, 2016

On August 20, 2016 at 0700 hours (Labrador time), 320 customers in Wabush, Labrador, serviced by distribution line 12 experienced a planned power outage. The outage was required to safely replace insulators. All customers were restored on August 20, 2016 at 1200 hours.

On August 21, 2016 at 1300 hours (Labrador time), 250 customers in Wabush, Labrador, serviced by distribution line 12 experienced a planned power outage. The outage was required to safely replace insulators. All customers were restored on August 21, 2016 at 1600 hours.

On August 30, 2016 at 1300 hours (Labrador time), 100 customers in Labrador City, Labrador, serviced by Line 2 experienced a planned power outage. The outage was

required to safely install a primary conductor. All customers were restored at 1700 hours (Labrador time), August 30, 2016.

On September 03, at 1300 hours (Labrador time), 100 customers in Labrador City, Labrador, serviced by Line 2 experienced a planned power outage. The outage was required to safely install a primary conductor. All customers were restored at 1600 hours (Labrador time), September 03, 2016.

On September 12, at 1021 hours, all customers (1760) serviced by the Bottom Waters Terminal Station experienced an unplanned power outage. The communities affected included Woodstock, Pacquet, Mings Bight, Nipper's Harbour, Kings Harbour, Smiths Harbour, Burlington, Middle Arm, Brent's Cove, La Scie, Round Harbour, Snook's Arm, Shoe Cove, Tilt Cove, Rambler and Anaconda Mine sites. The outage resulted from fallen trees on Newfoundland Power's transmission line 363L at Indian River Substation. All customers were restored at 1621 hours.

On September 14, customers (442) supplied by Bottom Waters feeder L7 in the town of La Scie experienced an unplanned power outage of four hours and 26 mins. The outage was caused by an insulator failure. Repair work included a replacement crossarm, insulator and a spliced broken primary conductor on pole #189.

On September 16, customers (1,760) supplied by the Bottom Waters Terminal Station experienced a planned power outage of one hour and six mins. The outage was required for NP to remove danger trees on transmission line 363L.

## Appendix C3: Underfrequency Load Shedding Events (Excluding Fourth Quarter)

On March 26, 2016 at 1102 hours, Cat Arm Generating Plant Unit 1 and Unit 2 tripped due to ice bridging and contamination on the insulators on the connecting transmission line, TL247 (Deer Lake to Cat Arm). With the removal of generation (approximately 120 MW) the system frequency dropped to 58.32 Hz resulting in the activation of the under frequency protection at Newfoundland Power (25,394 customers) and Hydro Rural (913 customers). Hydro advised Newfoundland Power they could restore load within 2 minutes after the event occurring. There was additional generation started at Bay d'Espoir and all Newfoundland Power customers were reportedly restored at 1117 hours with the exception of one feeder that the NP control room restored at 1126 hours. Total Island load at the time of the incident was 1212.7 MW. **(1,467 MW-mins)**

| | | |
|---|---|---|
| Load Shed: | Newfoundland Power: | 97 MW |
| | NLH | 3 MW |
| | Total Load Shed: | 100 MW |

Following the restoration of TL247 the Cat Arm Units were restored as follows:

At 1901 hours, March 26, 2016, Cat Arm Unit 2 available (67 MW).
At 1907 hours, March 26, 2016, Cat Arm Unit 1 available (67 MW).

On August 14, 2016, at 1350 hours, Holyrood Unit 3 tripped. With the removal of generation (approximately 68 MW) the system frequency dropped to 58.69 Hz resulting in the activation of the under frequency protection at Newfoundland Power (6,951 customers). Total Island load at the time of the incident was 680 MW. Hydro advised Newfoundland Power they could begin to restore load within three minutes after the event occurring. Newfoundland Power lost 11 MW of load. **(66 MW-Mins)**

Holyrood Unit 3 was restored to service by 2356 hours on August 14, 2016. Upon review of the targets in the plant and inspection of the Holyrood Unit 3 transformer, T3, it has been confirmed the unit tripped due to an over temperature on T3 transformer. This was a result of cooling controls being left in the off position and temperature alarms being blocked after work was completed to change coolers on T3 prior to returning the unit to service.

On August 24, 2016, at 1710 hours, Upper Salmon Unit tripped due to a lightning strike to its connecting 230 kV transmission line, TL234. With the removal of generation (approximately 65 MW) the system frequency dropped to 58.76 Hz resulting in the activation of the under frequency protection at Newfoundland Power (6,804 customers). Total Island load at the time of the incident was 729 MW.

Hydro advised Newfoundland Power they could begin to restore load within one minute of the event occurring. Newfoundland Power advised they had all feeders restored within four minutes with the exception of one. Corner Brook Pulp & Paper began restoring load within two minutes of the event occurring. **(78 MW-Mins)**

| | | |
|---|---|---|
| Load Shed: | Corner Brook Pulp and Paper: | 15 MW |
| | Newfoundland Power: | 12 MW |
| | Total Load Shed: | 27 MW |

## Appendix C4: Other Significant Transmission System Disturbances – 2016

There was one other reportable system disturbance in November. On November 24, the Stephenville gas turbine tripped while in synch condense mode. This trip resulted in a high voltage spike in the Stephenville area. Over voltage protection at Newfoundland Power's Gallants Substation operated to shed load to 6,212 customers. These customers were restored in 12 minutes. **(136 MW-Mins)**

## Appendix D: List of U.S.-Based Peers for Financial KPI Benchmarking

| **Transmission Peer Group:** | **Generation and Corporate Peer Group:** |
|---|---|
| AEP Texas North Company | Alcoa Power Generating Inc. |
| ALLETE, Inc. | ALLETE, Inc. |
| Aquila, Inc. | Aquila, Inc. |
| Avista Corporation | Avista Corporation |
| Central Illinois Public Service Company | Buckeye Power, Inc. |
| Delmarva Power & Light Company | Cleco Power LLC |
| Entergy Mississippi, Inc. | Electric Energy, Inc. |
| Kentucky Utilities Company | Entergy Mississippi, Inc. |
| MDU Resources Group, Inc. | Hawaiian Electric Company, Inc. |
| Mississippi Power Company | Indiana-Kentucky Electric Corporation |
| New York State Electric & Gas Corporation | Kentucky Power Company |
| Northern Indiana Public Service Company | Ohio Valley Electric Corporation |
| Northern States Power Company (Wisconsin) | Portland General Electric Company |
| Oklahoma Gas and Electric Company | Public Service Company of New Hampshire |
| Public Service Company of Colorado | Puget Sound Energy, Inc. |
| Public Service Company of Oklahoma | Savannah Electric and Power Company |
| Sierra Pacific Power Company, d/b/a NV Energy | Sierra Pacific Power Company, d/b/a NV Energy |
| Southwestern Electric Power Company | SOUTHERN ELECTRIC GENERATING COMPANY |
| Tucson Electric Power Company | Southern Indiana Gas and Electric Company |
| Westar Energy, Inc. | The Empire District Electric Company |

**Exhibit 8 - Holyrood Decommissioning Study**

# Decommissioning and Demolition of the Holyrood Thermal Generating Station

Final Report

Stantec

**Prepared for:**
Newfoundland and Labrador Hydro
500 Columbus Drive
P. O. Box 12400
St. John's, NL A1B 4K7

**Prepared by:**
Stantec Consulting Ltd.
845 Prospect Street
Fredericton, NB E3B 2T7

REGISTERED PROFESSIONAL ENGINEER
PEG Newfoundland and Labrador
MARC D. VOISINE
SIGNATURE
NOV 15/16
DATE
NEWFOUNDLAND & LABRADOR

File: 133547213_23_8

November 15, 2016

| Revision | Description | Author | | Quality Check | | Independent Review | |
|---|---|---|---|---|---|---|---|
| 0 June 3/16 | Draft | MEM/BDW | | BET | | MDV | |
| 1 Nov 15/16 | Final | MEM | | BDW | | MDV | |

This document entitled Decommissioning and Demolition of the Holyrood Thermal Generating Station was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Newfoundland and Labrador Hydro (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

# Table of Contents

**1.0 INTRODUCTION ..... 1**
1.1 BACKGROUND ..... 1
1.2 REPORT ORGANIZATION ..... 2

**2.0 DECOMMISSIONING AND DEMOLITION AT THE HTGS ..... 3**
2.1 REGULATORY REQUIREMENTS OF DECOMMISSIONING ..... 3
2.2 COMPONENTS OF DECOMISSIONING AND DEMOLITON ..... 4
2.2.1 Requirements of the Certificate of Approval to Operate ..... 6
2.2.2 Project Execution ..... 6
2.2.3 Demolition Risk ..... 7
2.3 PHASING OF DECOMMISSIONING AND DEMOLITION ..... 7
2.3.1 Phase 1 ..... 7
2.3.2 Phase 2 ..... 9

**3.0 OPINION OF PROBABLE COST ..... 13**
3.1 METHODOLOGY ..... 13
3.2 OPC ASSUMPTIONS, QUALIFICATIONS AND EXCLUSIONS ..... 15
3.3 OPC FOR THE HTGS ..... 16
3.3.1 Demolition Risk ..... 17
3.3.2 OPC Details ..... 17
3.4 PROJECTED CASH FLOW ..... 20

**4.0 APPENDICES ..... 21**

APPENDIX A DEMOLITION PLAN – SK-001 REV K
APPENDIX B DECOMMISSIONING AND DEMOLITION SCHEDULE
APPENDIX C DECOMMISSIONING AND DEMOLITION METHODOLOGY
APPENDIX D SITE PROJECT MANAGEMENT STAFFING
APPENDIX E HEAD OFFICE PROJECT MANAGEMENT STAFFING

# 1.0 INTRODUCTION

Newfoundland and Labrador Hydro (NLH) operates a three-unit, 490 MW (gross), thermal generating station at Holyrood, NL which supplies electricity to the Island's grid. With the planned implementation of the Muskrat Falls Generating Facility as part of the Lower Churchill Project, the electrical generation capability of the Holyrood Thermal Generating Station (HTGS) will no longer be required and selected portions of the station will be decommissioned and demolished. In order to complete long term financial planning, NLH is required to determine the cost of decommissioning and demolition the HTGS in order that an asset retirement obligation (ARO) can be estimated. As such, NLH retained the services of Stantec Consulting Ltd. (Stantec) to assist in the preparation of the ARO and this report presents that estimate as well as the assumptions and methodology utilized in developing the estimate.

In general terms, the ARO reflects a decommissioning and demolition that:

1. Complies with current environmental regulatory requirements.

2. Meets constructive obligations made by NLH to provincial regulators and neighbours of the facility.

3. Meets NLH's long term operational strategy for the HTGS.

## 1.1 BACKGROUND

The HTGS is located in the Town of Holyrood, approximately 50 kilometers south west of St. John's, on Conception Bay. The HTGS site is approximately 40 hectares in size and as shown on SK-001 in Appendix A, includes:

1. A powerhouse that encompasses three generation units (boiler house and turbines/generators), maintenance shops, a water treatment plant and administrative offices.

2. Two, 90 meter and one 110 meter high concrete stacks.

3. A waste water treatment system.

4. Two cooling water intake pump houses.

5. Numerous ancillary buildings and structures including a guardhouse, chemical storage buildings, hydrogen storage building, materials storage warehouse, training building, combustion gas turbine building and pipe shop.

6. A switch yard.

7. A hazardous waste landfill.

8. A Bunker C tank farm (approximately 140,000 cubic meters of storage capacity) and a day tank and diesel fuel storage (approximately 230 cubic meters of storage).

9. A marine jetty and pipeline (approximately 1400 meters in length) for offloading and transporting Bunker C to the tank farm and day tank.

The plant was constructed in two stages - Units #1 and #2 were installed in 1971 and Unit #3 was completed in 1979. In 1988 and 1989, Units #1 and #2 were modified to increase their output to 170 MW, bringing the total generating capacity of the station to 490 MW (gross).

In December 2012, the Government of Newfoundland and Labrador announced official sanction of the Muskrat Falls development as part of the Lower Churchill Falls Project (LCP). Once Muskrat Falls is brought into service in or about 2019, the HTGS will no longer be required to generate electricity; however, it will continue to be used for:

1. Synchronous condensing (SC) for grid voltage control.

2. Operational support of the 123.5 MW Combustion Turbine (CT) situated southeast of the powerhouse.

## 1.2 REPORT ORGANIZATION

This report presents a Class 3 Opinion of Probable Cost (OPC), for the planned decommissioning and demolition of the HTGS that can be presented to the Public Utilities Board. The OPC or ARO is based on an anticipated operating scenario at the HTGS prescribed by NLH, and is reflective of current regulatory requirements and constructive obligations made by NLH.

Section 1 provides an introduction and a brief overview of the site as it exists today and a general timetable of operations at HTGS, as the LCP comes on line.

Section 2 describes the planned operational functions at the HTGS and the regulatory framework that influences the decommissioning and demolition requirements. The general approach to decommissioning and demolition and project schedule are also presented.

Section 3 presents the OPC and an associated cash flow projection. The costing methodology, including assumptions and exclusions are also presented.

The appendices provide supporting detail.

# 2.0 DECOMMISSIONING AND DEMOLITION AT THE HTGS

When the LCP is brought into service in 2019, the HTGS will no longer be required to generate electricity; but it will continue to be used for SC operations and support of the CT. Based on these planned operations, NLH will have to consider: a number of federal and provincial Acts, Regulations and Guidelines; the requirements stipulated in their current Certificate of Approval (C of A) issued by the Newfoundland and Labrador Department of Environment and Conservation (NLDEC); and input from regulatory authorities, to define the exact nature, extent and requirements of decommissioning and demolition. NLH will also have to consider the constructive obligations it has made to the regulators and the public regarding the scope and timing of demolition activities. Together, the regulatory requirements and constructive obligations will shape the decommissioning and demolition plan for the HTGS.

## 2.1 REGULATORY REQUIREMENTS OF DECOMMISSIONING

Based on a review of environmental statutes it appears the legislation identified below will govern the scope and timing of demolition as there is no all-encompassing piece of legislation or policy that stipulates decommissioning and demolition requirements in the Province of Newfoundland and Labrador.

Preliminary discussions were held with representatives of the NLDEC as part of developing the regulatory framework, but it is suggested that additional input from regulators will be required as the project scope is finalized and as planning proceeds to ensure compliance and that all environmental issues are addressed in an appropriate manner.

Based on a review of federal legislation, the Canadian Environmental Assessment Act (CEAA) does not apply because of the nature and scope of the project; nor will an authorization from the federal Department of Fisheries and Oceans be required for the demolition of the marine jetty and causeway. This should be re-confirmed with the appropriate regulatory authorities when the project scope has been clearly defined and the demolition project is imminent.

The following acts/regulations apply:

***Environmental Protection Act (SNL – 2002 c E-14.2)***

*Certificate of Approval to Operate for the HTGS - AA11-085563, issued to NLH pursuant to Section 83 of the Environmental Protection Act.*

Appendix A – Part 16 requires compliance with the Storage and Handling of Gasoline and Associated Products Regulations 58/03 which, per Section 25. (3) mandates that the owner of a storage tank system to, within 30 days of abandonment, empty the system of all liquids and vapours and dismantle and remove or dispose of the tank system including the dyke and remove the impacted material to the satisfaction of the NLDEC.

Appendix A - Part 21 requires that a plan to restore areas disturbed by the operation be submitted to the NLDEC ten months before closure.

Appendix B – Provides general objectives for site decommissioning and elements to be included in the decommissioning and restoration plan. Specific clean-up criteria are not provided, but a phased environmental investigation to identify the type, extent and degree of impacts at the site is to be undertaken, and the site is to be restored to a condition acceptable to the NLDEC.

*Environmental Assessment Regulations 54/03*

Sections 34.(1) and 26 of the regulation, require that the decommissioning of an electric power generating facility be registered as an undertaking.

*Storage and Handling of Gasoline and Associated Products Regulations 58/03.*

Section 25.(3) of the regulation mandates cleaning and dismantling and disposal of the an above ground petroleum storage tank system.

***Canadian Environmental Protection Act***

*PCB Regulations SOR/2008-273*

This federal regulation dictates the management, storage and disposal of PCBs, and Section 19 stipulates that the owner of PCBs shall, within 30 days after they are no longer used; either send them for destruction or for storage at a PCB storage site.

***Canadian Navigation Protection Act***

This federal regulation requires the submission of a 'Notice of Works' to the Navigation Protection Program (Transport Canada), describing the demolition of the marine jetty and causeway. It is assumed that the work will be deemed as 'not likely to substantially interfere with navigation' and that ministerial approval will not be required.

There are a number of other acts and regulations, in addition to those described above that prescribe specific decommissioning requirements in a variety of areas – i.e. management of asbestos containing materials, or removal of halocarbons; water resource management, etc. While they are not listed, compliance with these requirements is reflected in the decommissioning methodology and the ARO presented herein.

## 2.2 COMPONENTS OF DECOMISSIONING AND DEMOLITON

In light of the plan to cease electrical generation at the HTGS after the LCP project comes on line, a two phase approach to demolition will be undertaken such that demolition can begin and planned SC and CT operations can continue in a safe manner.

Engineering and planning for Phase 1 will begin in early 2020 with most of the Phase 1 demolition occurring in 2021 and 2023. Phase 2 planning will begin once the SC and CT operations conclude. Once initiated, Phase 2 is expected to be completed within a five year period.

It is assumed that NLH will retain ownership of the entire HTGS site for the foreseeable future and the land use will be classified as 'Industrial'.

The key decommissioning and demolition components are listed below:

**Phase 1**

1. Cleaning and demolition of Bunker C Tanks #1 to #4.
2. Cleaning and demolition of the Bunker C day tank and fuel additive tank.
3. Cleaning and demolition of the Bunker C pipeline.
4. Demolition of the marine jetty and causeway.
5. Demolition of the three powerhouse stacks and breeching.
6. Demolition of the previously decommissioned 10 MW gas turbine building.
7. Cleaning and removal of seven transformers associated with Units #1 and #2.

**Phase 2**

1. Asbestos abatement and cleaning of the boilers and boiler house.
2. Demolition of the powerhouse and all internals and equipment.
3. Cleaning and removal of four Unit #3 transformers.
4. Demolition of the two cooling water pumphouses and associated piping.
5. Cleaning and demolition of the waste water treatment plant.
6. Cleaning and demolition of the equalization basins and building.
7. Capping of the hazardous waste landfill and decommissioning of the leachate pond.
8. Cleaning and demolition of the diesel fuel storage tanks serving the powerhouse.

At present there are no plans to demolish the ERT building, hydrogen storage building, shawmont (warehouse) building, chemical storage building, training center, pipe shop building,

the metershop building or the CT. Please refer to drawing SK-001 Rev K, in Appendix A depicting which components are to be demolished and when.

### 2.2.1 Requirements of the Certificate of Approval to Operate

In addition to the tasks listed above, NLH will be required, as stipulated in their current Certificate of Approval to Operate, to:

1. Complete an intrusive environmental investigation at the HTGS to identify and quantify potential contaminants of concern on the site (Phase II Environmental Site Assessment (ESA)) and to manage any impacted soils and groundwater either through remediation or risk management.

2. Prepare and submit to the NLDEC, a plan to restore areas disturbed by the HTGS operations (closure plan).

3. Register the closure of the HTGS as an undertaking as stipulated in the provincial Environmental Assessment Regulations (EA Registration).

These environmental activities are captured in the project schedule and OPC.

### 2.2.2 Project Execution

It is expected that the decommissioning and demolition will be planned, managed and overseen by NLH staff, at the plant and head office. In addition, HTGS staff will assist with selected decommissioning activities (chemical removals, sludge management, electrical disconnects/ isolation, boiler wash down, and contract administration, etc.), because experience has shown that this is the most efficient and effective way to complete these power plant related tasks.

It is also assumed that NLH will retain the services of an engineering consultant to assist with: project planning, preparing an EA registration and closure plan, conducting a Phase II ESA and remedial action plan, preparing decommissioning and demolition tender packages and periodic construction monitoring and support.

The demolition (including fuel tank decommissioning and asbestos abatement) will be carried out by a suitably qualified demolition contractor with a documented safety record and expertise in the required demolition components. It is also assumed that inert construction debris generated from the decommissioning and demolition work will be disposed of in a properly constructed and duly permitted on-site facility in the area of the former Bunker C tank farm.

The project task responsibilities are described in Section 2.3.

### 2.2.3 Demolition Risk

Based on discussions with an experienced demolition contractor, it is recommended that NLH consider the implications of Phase 1 demolition of the three stacks on planned SC and CT operations. While believed to be relatively small, there is a risk that the Phase 1 stack demolition could negatively affect SC operations. The risk can be mitigated by delaying the demolition until the end of SC operations or employing an alternate stack demolition method. This is discussed in further detail in Section 3.

## 2.3 PHASING OF DECOMMISSIONING AND DEMOLITION

The general sequence of events is presented below and a detailed schedule, including activity durations, is provided in Appendix B. Demolition methodology is provided in Appendix C.

### 2.3.1 Phase 1

Phase 1 will be conducted over a four year period and will include engineering and planning, a Phase II ESA and remediation/risk assessment, registration of the project for an environmental assessment and execution of decommissioning and demolition tasks by NLH staff and suitably qualified contractors retained through a competitive bidding process. It is envisioned that three separate tenders will be issued to complete the demolition and associated tasks in Phase 1. The majority of the demolition in Phase 1 will be completed by mechanical means with the exception of the three stacks which will be dropped using a controlled, explosive method.

**2020**

Engineering and planning will be initiated in 2020 and will include preparation of decommissioning and demolition tenders and submission of an environmental assessment registration and closure plan to the NLDEC.

**2021**

A tender will be awarded for selected demolition work and NLH staff will begin decommissioning activities including removal of:

1. Bulk surplus chemicals remaining in the powerhouse (returned to the supplier or disposed of) in accordance with regulations.

2. Surplus recoverable Bunker C and other hydrocarbons (returned to supplier or disposed of) in accordance with regulations. It is assumed that NLH will manage their fuel inventory such that only one tank will contain fuel at the lowest possible level.

3. Miscellaneous small volumes of chemicals in the powerhouse for disposal in accordance with environmental or hazardous waste regulations, as appropriate.

Once the chemicals and hydrocarbons are removed, the demolition contractor will:

1. Initiate sludge removal, cleaning and demolition of the four Bunker C tanks, the day tank and the fuel additive tank. The tank foundations shall be cleaned, but will remain in place. It is assumed that the demolition contractor will retain the services of a local, licensed petroleum contractor to complete this work.

2. Clean and dispose of the day tank enclosure (above grade knee wall), but the enclosure foundations below grade shall remain.

3. Drain and clean the Bunker C piping system from the marine jetty to the burner fronts of all three boilers.

4. Demolish the cleaned pipeline from the marine jetty to the South wall of the powerhouse and cut and remove the pipeline supports at ground level. The support foundations will remain in place.

5. Demolish and remove the previously decommissioned gas turbine building leaving the floor slab and foundation in place.

6. Drain and remove the seven transformers - including T1, UST-1, RT1, T9, T2, UST 2 and RT2 associated with Units #1 and #2.

As the demolition concludes in the fall of 2021, NLH will complete an intrusive Phase II ESA. All areas of the site that are to be decommissioned or demolished, excluding the diesel oil fuel storage tank area near the pipeline and the transformer area, will be assessed, although focus will be upon Bunker C tank farm, pipeline and area north of the powerhouse. The excluded areas will be assessed at a later date.

Impacted soils and groundwater identified in the Phase II ESA will be managed either through remediation and/or risk management.

At the same time as the intrusive investigations, NLH will also complete a hazardous building materials assessment. This will identify the extent and type of existing hazardous materials and will confirm that debris can be safely disposed of in an on-site facility. It is possible that some material identified in the hazardous building materials assessment may require special disposal at an off-site hazardous waste landfill.

Permitting for the on-site construction and debris (C&D) disposal facility will also be completed in 2021.

**2022**

As remediation requirements are currently unknown and will not be determined until late 2021 with the completion of a Phase II ESA, no active demolition is planned for 2022. Required soils

and groundwater remediation will be conducted at that time. However, if it is determined that soil and/or groundwater impacts can be successfully managed through risk assessment and/or minimal remedial work, it is possible that the demolition scheduled for 2023 could occur in 2022.

It is also assumed that a tender for the construction of a C&D site in the area of the former Bunker C tank farm, to permit the cost effective on-site management of inert debris, will be awarded and the facility constructed.

**2023**

In 2023, the final tender of Phase 1 will be awarded for the remaining demolition. This will include:

1. The marine jetty, causeway to the jetty, associated components (shed, lights, electrical, etc.) and the supports. The supports (concrete filled steel tubes) shall be cut at the seabed and the sub-seabed foundations shall remain. Demolition will follow best practices to minimize any environmental impacts on the marine environment, including the use of a silt curtain and debris will be placed in the on-site C&D facility.

2. The three stacks and breeching exterior to the plant. The concrete from the stacks shall be crushed to 6" minus and disposed of in the on-site C&D facility. The openings in the north end of the boiler house created by the removal of the breeching shall be re-sided and the building made weather tight.

Following the placement of debris in the C&D facility, it shall be covered to limit infiltration of precipitation and snow melt. The closure of the C&D facility will conclude Phase 1 activities.

### 2.3.2 Phase 2

Phase 2 will be conducted over a five year period and will include engineering and planning, environmental site assessment and remediation/risk assessment, and execution of decommissioning and demolition tasks by NLH staff and suitably qualified contractors retained through a competitive bidding process. It is envisioned that a single contract will be called for the demolition work described herein. Similar to Phase 1, most of the demolition work will be completed by mechanical means, but the boiler house and boilers will be dropped using explosives. A separate contract will be called, as required, for environmental remedial work.

**Year 1**

Engineering and planning will be initiated in year 1 and will include preparation of a decommissioning and demolition tender.

**Year 2**

A tender will be awarded for decommissioning and demolition and NLH staff will begin decommissioning activities in the turbine hall and balance of the powerhouse, including removal of:

1. Surplus chemicals (returned to the supplier or disposed of) in accordance with regulations.

2. Surplus recoverable diesel fuel (returned to supplier or disposed of) in accordance with regulations.

3. Miscellaneous small volumes of chemicals and ozone depleting substances for disposal in accordance with environmental or hazardous waste regulations, as appropriate.

Once the chemicals and hydrocarbons are removed by NLH, the contractor will complete environmental decommissioning and asbestos abatement tasks. During the removal of asbestos containing materials (ACM), NLH will engage the services of a specialized contractor to monitor the abatement to ensure worker safety and regulatory compliance. They will also sample suspected ACM as discovered during the demolition.

The contractor will:

1. Clean and demolish the two above ground, horizontal diesel fuel oil storage tanks and associated piping near the Bunker C tank farm. The foundations shall be cleaned, but remain in place.

2. Drain and remove the four remaining transformers T3, UST-3, SST1-2 and SST 3-4 for disposal at an approved facility.

3. Remove and dispose of mercury containing devices and lights for off-site disposal.

4. Drill low points and drain residual product, flush and clean the lines of all other oil and chemical systems previously drained in Phase 1.

5. Remove by hand, friable ACM that may be contaminated with ash (heavy metals) and could have a very low pH. The contractor will follow Type 3 removal procedures, including the off-site disposal of cladding and insulation from Boilers 1 and 2. Boiler 3 cladding and insulation is not assumed to be ACM, but must be removed as Type 3 and disposed of as ACM, due to ash contamination.

6. Manage ACMs that are discovered as demolition proceeds.

NLH staff will wash down Boilers #1 and #2 and the building interior in year 2 after asbestos abatement procedures are carried out by the contractor. Boiler #3 wash down will occur in year 3 as the ACM abatement for that particular unit will not be completed until late in year 2.

NLH will also engage a consultant to complete an intrusive Phase II ESA in the area of the diesel oil fuel storage tanks near the pipeline and in the transformer area. Impacted soils and groundwater will be managed either through remediation and/or risk management.

**Year 3**

NLH staff will complete the wash down of Boiler #3 and plug the floor drains/trenches in the powerhouse at grade level, and the contractor will continue to prepare for the demolition of the powerhouse. The contractor will:

1. Remove the non-friable Galbestos siding on the powerhouse. It is assumed that mechanical removal of non-friable Galbestos will be permitted and it will be disposed of in the on-site C&D site.

2. Mechanically demolish the turbine hall and equipment and equipment foundations within. The equipment footings/foundations will be removed to permit the boilers to drop to grade to facilitate their demolition. The floor slab will remain.

3. Drop the boiler building using explosives and then complete the demolition by mechanical means. The floor slab of the boiler building and equipment foundations shall remain. Concrete from demolition of the powerhouse will be crushed to 6" minus and will be placed in the on-site C&D site.

**Year 4**

Continuing under the same contract, the demolition contractor will clean the trenches and sumps in the power house and then move to the ancillary buildings and infrastructure situated north of the powerhouse. Specifically, the two cooling water pumphouses, the equalization basin building, and the waste water treatment building will be demolished.

NLH staff will be responsible for removing any sludge remaining in the waste water treatment and equalization basin buildings and leachate pond in advance of demolition.

The contractor will:

1. Steam clean or power wash trenches and sumps in the powerhouse.

2. Remove the non-friable Galbestos siding on cooling water pumphouse 2, for on-site disposal.

3. Demolish both cooling water pumphouses. The floor slabs, wet wells and sub surface foundations shall remain, but the wet wells and intakes will be backfilled.

4. Demolish the equalization basins and building, and the waste water treatment equipment and building. The floor slab, foundations and equipment foundations shall remain.

5. Dewater and backfill the leachate lagoon.

6. Cap and close the hazardous waste landfill.

7. Excavate, open and backfill all piping greater than 24" in diameter, including the seal pits, utilidors, oil/water separators and the wet wells.

8. Place concrete caps in the CW inlets and outlet piping. The rip rap breakwater shall remain intact.

9. Cap and close C&D facility.

Once the buildings north of the powerhouse are removed, NLH will conduct an intrusive Phase II ESA in this area.

**Year 5**

Any impacted soils and groundwater identified in the Phase II ESA will be managed either through remediation and/or risk management. If required, the hazardous waste landfill will be temporarily reopened for the economical on-site disposal of impacted soils and then recapped.

Final closure reporting will also be completed in year 5.

As stated earlier, based upon current assumptions, the Holyrood site is expected to remain an industrial site. As a result, at this time there are no legal or constructive requirements to remove the remaining assets in Phase 2. However, the scope of the required decommissioning could change based upon changes in assumptions, updates in regulations or directions from governing agencies such as the NLDEC. It is recommended that as the assumptions and requirements of the environmental regulators become known, the estimate be further refined for Phase 2.

# 3.0 OPINION OF PROBABLE COST

Section 3 presents the opinion of probable cost (OPC) of the planned decommissioning and demolition and an associated cash flow projection based upon the proposed long term operational objectives and the legislative and constructive obligations as described in Section 2. The costing methodology, including assumptions and exclusions are also presented.

## 3.1 METHODOLOGY

The OPC was developed by first defining the operational requirements of NLH and the legislative and constructive constraints governing decommissioning and demolition. Once these were established, an approach and schedule for the demolition was developed and budget pricing from a nationally based contractor with recent experience in demolishing two similarly sized thermal generating stations in Atlantic Canada and a 2400 MW plant in Ontario was sought. In addition to budget pricing from the demolition contractor, the OPC was developed using budget pricing from local suppliers and contractors, salary and labour burden data from NLH, and in house experience with demolition pricing.

The OPC was sub-divided into 5 groupings and the methodology for the development of the OPC within each group is presented below.

**Environmental Compliance and Studies**

Environmental Compliance and Studies includes those tasks to be completed to ensure the appropriate environmental permits, studies and assessments are completed, including hazardous materials surveys, asbestos monitoring, ESAs, environmental remediation, EA registration, landfill permitting and closure reporting. This grouping also includes an allowance for future studies.

Development of environmental compliance costs were based upon in house experience with similar type projects in NL, DELC requirements, and local laboratory and equipment rental costs.

No intrusive environmental studies were conducted as part of this cost estimate and only limited consultation with environmental regulators has been conducted to date. It is possible that requirements beyond those identified in current legislation may be imposed upon the project. Nevertheless, allowances to register the project under provincial environmental assessment legislation; complete Phase II ESAs, remediation and risk assessments; and to comply with existing regulatory requirements are carried in the OPC. A cost to complete a full environmental assessment is not included, as it is not known if this will be required.

**Environmental Decommissioning**

Environmental decommissioning includes chemical and fuel removals, tank and pipeline cleaning, asbestos abatement, development of a C&D landfill, hazardous waste management/disposal and closure of the landfills.

Development of decommissioning costs were based on the demolition contractor's experience, local contractor pricing, and estimated time and salary and labour burden costs for NLH staff to support and/or complete in plant tasks. Decommissioning includes ACM abatement, cleaning of petroleum storage tanks and removal of transformers, etc.

NLH time to support the decommissioning was also included and was based on Stantec experience with similar type demolition projects in Atlantic Canada. The following on-site staffing compliment is anticipated: shift supervisors/operators, chemical technicians/environmental management system coordinators, electricians, and utility/laborers. Staff responsible for contract administration will be full time, others will be part time. Further details on the required site support times are provided in Appendix D.

**Demolition**

Demolition includes the dismantling of site infrastructure for off-site recycling or disposal or on site landfilling. The infrastructure to be demolished is illustrated in SK-001 in Appendix A.

In order to develop the demolition cost, an experienced contractor visited the HTGS site and was provided with facility drawings, material quantities and photographs. The contractor pricing was supplemented by in house experience with demolition and components of the contractor's pricing were cross checked with budget pricing from local environmental and hazardous waste contractors. All sub-contractors to the general demolition contractor were assumed to be marked up at 15%, per the industry standard.

In addition, quantities and unit rates for civil works during demolition were developed, including: the C&D landfill and landfill and leachate pond capping, excavation and backfilling of voids (equalization basis, utilidors, seal pits, cooling water pumphouses buried piping) and installation of concrete caps on the cooling water intakes and discharges.

**Owner's Management and Engineering Costs**

Owner's management and engineering costs include direct and indirect, on site and head office project management and engineering fees associated with preparation of tender documents for the decommissioning and demolition, assistance during tendering, bid review, project planning assistance, and support during construction.

Development of Owner's costs for direct, on-site and head office project management and indirect project management were based on input from NLH and current NLH salary and labour burden costs. The direct project management staffing from site is assumed to include: a site

supervisor, administrative assistant, a safety specialist and two plant engineers. Head office direct project management staffing includes: a project manager, two project engineers, an environmental specialist, a safety hygienist, communications personnel and a scheduler, none of whom are dedicated to the project on a full time basis.

Indirect, head office, project management staff includes legal support, safety, human resources and procurement assistance at an assumed percentage of the overall project costs.

Further details on the required project management support time for direct Head Office and on-site staff is provided in Appendices D and E respectively.

Engineering costs of 15% of project costs were based on in house experience with similar decommissioning and demolition projects in New Brunswick. Full time, on-site engineering support during construction is not included in the estimate.

**Contingencies**

Contingencies are included in the OPC as monies that will be expended during the course of the project, but are currently unidentified. Contingencies have been added to the OPC presented herein and vary in each grouping with the degree of confidence in the estimate, the lower the contingency, the higher the anticipated accuracy.

**Scrap Metal and Salvage**

As directed by NLH, the OPC did not capture any value for remaining equipment or scrap. Given the current project planning horizon and the volatility in scrap metal pricing, it is believed that this is a most prudent costing approach.

## 3.2 OPC ASSUMPTIONS, QUALIFICATIONS AND EXCLUSIONS

The OPC presented herein is based upon the following assumptions, exclusions and/or qualifications:

1. Environmental assessment and remediation costs are based on an assumed level of effort and that on-site management of impacted soils will be permitted.

2. Environmental assessment and remediation of areas outside of the HTGS have not been included.

3. Decommissioning of the air quality monitoring stations associated with the HTGS has not been included.

4. Remaining equipment has no salvage value.

5. Metals recovered in the demolition have no assigned scrap value in the estimate.

6. NLH will capture the sunk cost of the unusable Bunker C fuel, as a write off within their internal accounting systems. The disposal cost of unusable fuel is included in the OPC.

7. All costs are presented in 2016 dollars (no escalation).

8. Union rates for labour, with no room and board allowance are used for NLH and contractor staffing.

9. Taxes are not included.

10. Maintenance and/or modifications to the water treatment, circulating cooling water system, and waste water treatment systems and equalization basins are not included.

## 3.3 OPC FOR THE HTGS

The OPC for the Phase 1 decommissioning and demolition of the HGTS is $15,237,000 and a breakdown of the cost is provided in Table 1 below.

**Table 1: Summary of Phase 1 Decommissioning and Demolition Costs**

| OPC Components | Phase 1 | % of Total |
|---|---|---|
| Environmental Compliance and Studies | $1,377,000 | 9 |
| Environmental Decommissioning | $2,988,000 | 20 |
| Demolition | $4,400,000 | 29 |
| Owner's Management and Engineering | $4,563,000 | 30 |
| Contingency | $1,909,000 | 12 |
| **Total** | **$15,237,000** | **100** |

Detailed breakdowns are provided in Section 3.3.2.

The OPC for the Phase 2 decommissioning and demolition of the HGTS is $25,839,000 and a breakdown of the cost is provided in Table 2 below.

It is noted however that, because the scope of Phase 2 activities could change based upon changes in assumptions, updates in regulations or directions from governing agencies such as the NLDEC, the Phase 2 costs are provided for information and comparative purposes only; and will not be included in the ARO submitted to the PUB.

**Table 2: Summary of Phase 2 Decommissioning and Demolition Costs**

| OPC Components | Phase 2 | % of Total |
|---|---|---|
| Environmental Compliance and Studies | $ 367,000 | 4 |
| Environmental Decommissioning | $5,879,000 | 22 |
| Demolition | $9,143,000 | 33 |
| Owner's Management and Engineering | $7,368,000 | 29 |
| Contingency | $3,082,000 | 12 |
| **Total** | **$25,839,000** | **100** |

Detailed breakdowns are provided in Section 3.3.2.

### 3.3.1 Demolition Risk

As noted in Section 2, there is a risk that the powerhouse could be damaged and SC and CT operations be impacted should the three stacks be demolished in Phase 1 as opposed to a later time at the planned end of SC operations. This is because of the potential for flying debris to damage the roof and equipment within the adjacent powerhouse. There is also a risk that the controlled explosive demolition could fail and the stacks would remain standing but in a weakened and unsafe state.

The risk of damage or failure could be mitigated by delaying the demolition until the end of SC operations or by employing an alternate stack demolition procedure utilizing specialized wall climbing scaffolding for the upper portions of the stack. It is also anticipated that windy conditions would require many starts and stops to the operations, increasing standby times and the duration of the work.

### 3.3.2 OPC Details

This section provides a detailed breakdown of decommissioning and demolition costs by phase and illustrates contractor and NLH costs. Table 3 provides a detailed breakdown of the Phase 1 and Table 4 provides the breakdown for Phase 2.

**Table 3: Phase 1 Decommissioning and Demolition Costs**

| | Phase 1 - 2020 -2023 | |
|---|---|---|
| 1 | **A. Environmental Compliance and Studies** | **Total** |
| 2 | Hazardous Building Materials Survey | $ 30,000 |
| 3 | Permitting - EA Registration, Closure Plan and C&D Landfill Permitting | $ 60,000 |
| 4 | Phase II Environmental Site Assessment | $ 239,000 |
| 5 | Environmental Risk Assessment and Remediation | $ 698,000 |
| 6 | Future Studies | $ 350,000 |
| 7 | Sub-total | $ 1,377,000 |
| 8 | **B. Environmental Decommissioning** | **Total** |
| 9 | Cleaning of Bunker C, day and additive tanks and associated pipeline | $ 2,400,000 |
| # | Bulk, small volume chemical removal and sweep | $ 173,515 |
| # | NLH staff support, electrical disconnects/isolation activities, contract admin | $ 116,370 |
| # | Drain 7 transformers and dispose of oils and carcasses | $ 85,293 |
| # | Develop C&D disposal site and parital cap | $ 180,040 |
| # | Prep of stack fall area | $ 32,903 |
| # | Sub-total | $ 2,988,121 |
| # | **C. Demolition** | **Total** |
| # | Mobilization and demobilization | $ 75,000 |
| # | Demolish Bunker C tanks, day and fuel additive tanks and pipeline | $ 810,000 |
| # | Demolish marine jetty and access bridge | $ 1,650,000 |
| # | Demolish stacks, breeching and protection of powerhouse/ancillary bldgs | $ 1,830,000 |
| # | Repair, install new siding in boiler house wall at breeching locations | $ 9,900 |
| # | Demolish decommissioned gas turbine building | $ 25,000 |
| # | Sub-total | $ 4,399,900 |
| # | **D. Owner's Management and Engineering Costs** | **Total** |
| # | On Site Project Management Team | $ 1,352,743 |
| # | Head Office Project Management Team | $ 1,369,218 |
| # | Head Office (legal, safety, HR, procurement at 6% A, B and C) | $ 525,901 |
| # | Engineering Support (15% of A, B and C) | $ 1,314,753 |
| # | Sub-Total | $ 4,562,615 |
| # | **E. Contingency** | **Total** |
| # | Environmental Planning Contingency @ 25% | $ 344,250 |
| # | Decommissioning Contingency @ 15% | $ 448,218 |
| # | Demolition Contingency @ 15% | $ 659,985 |
| # | Owner's Costs Contingency @10% | $ 456,262 |
| # | Sub-total | $ 1,908,715 |
| # | **Phase 1 TOTAL DECOMMISSIONING AND DEMOLITION COST** | **$ 15,236,351** |

**Table 4: Phase 2 Decommissioning and Demolition Costs**

| # | **Phase 2** | |
|---|---|---|
| # | **A. Environmental Compliance and Studies** | **Total** |
| # | Environmental Liasion | $ 50,000 |
| # | Asbestos abatement monitoring and sampling | $ 100,000 |
| # | Phase II Environmental Site Assessment | $ 50,000 |
| # | Environmental Risk Assessment and Remediation | $ 117,380 |
| # | Post closure reporting | $ 50,000 |
| # | Sub-total | $ 367,380 |
| # | **B. Environmental Decommissioning** | **Total** |
| # | Diesel fuel recovery (Credit for fuel = cost of removal) | $ - |
| # | Cleaning of diesel fuel tanks | $ 7,100 |
| # | Chemical/sludge removal, drain oils, plug drains,clean oily water separators | $ 112,615 |
| # | Washdown of boilers and building | $ 110,400 |
| # | NLH staff support, electrical disconnects, chem techs and contract admin | $ 1,898,341 |
| # | Drain 4 transformers and dispose of oils and carcasses | $ 48,739 |
| # | Drilling lines, removal of chemicals and mercury containing items and lights | $ 486,736 |
| # | Abatement of asbestos containing materials (boilers and boiler cladding) | $ 2,259,009 |
| # | Abatement of asbestos containing materials (defined during demolition) | $ 100,000 |
| # | Management of lead and/or zinc impacted paint | $ 50,000 |
| # | Close C&D disposal site | $ 327,533 |
| # | Close hazardous waste landfill and backfill lagoon | $ 478,710 |
| # | Sub-total | $ 5,879,183 |
| # | **C. Demolition** | **Total** |
| # | Contractor mobilization and demobilization | $ 306,605 |
| # | Demolish diesel fuel tanks | $ 10,000 |
| # | Demolish turbine hall and T/G units | $ 1,737,000 |
| # | Demolish boiler house and units | $ 6,103,042 |
| # | Demolish cooling water pumphouses | $ 167,000 |
| # | Demolish WWT and equilzation basin buildings | $ 95,139 |
| # | Backfill voids, trenches, cap cooling water intake/outlets and wetwells | $ 723,805 |
| # | Sub-total | $ 9,142,591 |
| # | **D. Owner's Management and Engineering Costs** | **Total** |
| # | On Site Project Management Team | $ 2,246,400 |
| # | Head Office Project Management Team | $ 1,890,000 |
| # | Head Office (legal, safety, HR, procurement at 6% A, B and C) | $ 923,349 |
| # | Engineering Support (15% of A, B and C) | $ 2,308,373 |
| # | Sub-Total | $ 7,368,122 |
| # | **E. Contingency** | **Total** |
| # | Environmental Planning Contingency @ 25% | $ 91,845 |
| # | Decommissioning Contingency 15% | $ 881,877 |
| # | Demolition Contingency @ 15% | $ 1,371,389 |
| # | Owner's Costs Contingency @10% | $ 736,812 |
| # | Sub-total | $ 3,081,923 |
| # | **Phase 2 TOTAL DECOMMISSIONING AND DEMOLITION COST** | **$ 25,839,200** |

## 3.4 PROJECTED CASH FLOW

The projected cash flow for the two project phases is provided in Tables 4 and 5 below. The contingency is distributed across the duration of the project on a weighted basis.

**Table 5: Phase 1 Cash Flow – 2020-2023**

| Year | Total |
|---|---|
| 1 | $1,554,000 |
| 2 | $5,759,000 |
| 3 | $2,255,000 |
| 4 | $5,668,000 |
| **TOTAL** | **$15,236,000** |

**Table 6: Phase 2 Cash Flow**

| Year | Total |
|---|---|
| 1 | $2,300,000 |
| 2 | $6,227,000 |
| 3 | $10,956,000 |
| 4 | $4,237,000 |
| 5 | $2,119,000 |
| **TOTAL** | **$25,839,000** |

# 4.0 APPENDICES

Appendix A Demolition Plan – SK-001 Rev K

Appendix B Decommissioning and Demolition Schedule

Appendix C Decommissioning and Demolition Methodology

Appendix D Site Project Management Staffing

Appendix E Head Office Project Management Staffing

# APPENDIX A

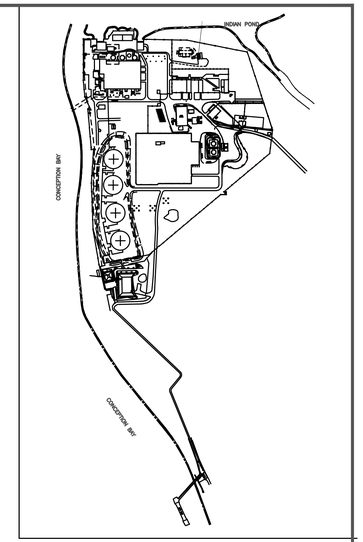
Demolition Plan – SK-001 Rev. K

PUMPHOUSE #2
INDIAN POND
WASTE WATER TREATMENT EQUALIZATION BASINS
DAY TANK
ABANDONED SEPTIC FIELD
PUMPHOUSE #1
NEW SEPTIC SYSTEM
WASTE WATER TREATMENT PLANT
#1 #2 #3
CHEMICAL STORAGE BUILDING
BOILERHOUSE TURBINE/ GENERATORS
MAINTENANCE BUILDINGS
BOILER STACKS
1 SK-001
SEE DETAIL 1 FOR TRANSFORMER DECOMMISSIONING
TRAINING CENTER
COOLING WATER DISCHARGE
ROADWAY
HYDROGEN STORAGE BUILDING
SHAWMONT BUILDING (WAREHOUSE)
ERT BUILDING
CTG
DECOMMISSIONED GAS TURBINE
BUNKER 'C' LINE BETWEEN TANK FARM AND DAY TANK
BLACK START GENERATORS
DIESEL FUEL TANKS
SWITCH YARD
TANK #1
CONCEPTION BAY
TANK FARM
16"ø BUNKER 'C' PIPELINE FROM JETTY
HAZARDOUS WASTE LANDFILL (RETAIN & CAP)
LEACHATE HOLDING POND

N

RT1 RT2
UST1 T9 UST2 SST12 UST3 SST34
T1 T2 T3
ROADWAY

DETAIL 1
SCALE: NTS SK-001
TRANSFORMER DECOMMISSIONING




KEY PLAN

16"ø BUNKER 'C' PIPELINE
CAUSEWAY
JETTY HEAD

LEGEND

- DEMOLISH AND/OR DECOMMISSION BUILDINGS AND EQUIPMENT ~PHASE 1
- DEMOLISH AND/OR DECOMMISSION BUILDINGS AND EQUIPMENT ~PHASE 2
- TO REMAIN
- MANAGED BY OTHERS TRANSMISSION ASSET

PRELIMINARY
FOR INFORMATION ONLY

| DWG.NO. | TITLE |
|---|---|
| REFERENCE DRAWINGS | |

| NO. | DATE | DESCRIPTION | DWN. | DESIGN. | CHK. | APP'D |
|---|---|---|---|---|---|---|
| J | 2016-06-23 | GENERAL REVISION | MEO | | | |
| H | 2016-06-03 | GENERAL REVISION | JRC | | | |
| G | 2016-05-06 | GENERAL REVISION | JRL | | | |
| F | 2016-05-04 | GENERAL REVISION | JRL | | | |
| E | 2016-04-21 | GENERAL REVISION | JJB | | | |
| D | 2016-04-14 | GENERAL REVISION | JJB | | | |

REVISIONS

Stantec | P.M. MEM | P.T.
JOB No. | DWG. No.

This Drawing contains intellectual property of Nalcor Energy and shall not be copied or distributed in whole or in part without prior written consent from Nalcor Energy. Use of the drawing shall be restricted to purposes of prosecution of a contract with Nalcor Energy.

newfoundland labrador hydro a nalcor energy company

**Newfoundland and Labrador Hydro**

# HOLYROOD THERMAL GENERATING STATION DEMOLITION PLAN

| | | |
|---|---|---|
| ELECT. | SCALE: | NTS |
| CIVIL | DESIGNED: | MDV |
| TRANS. | DRAWN: | JJB |
| MECH. | DATE: | 2016-04-04 |
| P&C | CHECKED: | |
| TELC. | APPROVED: | |

W.O. NO.
DWG. NO. SK-001
REV. K

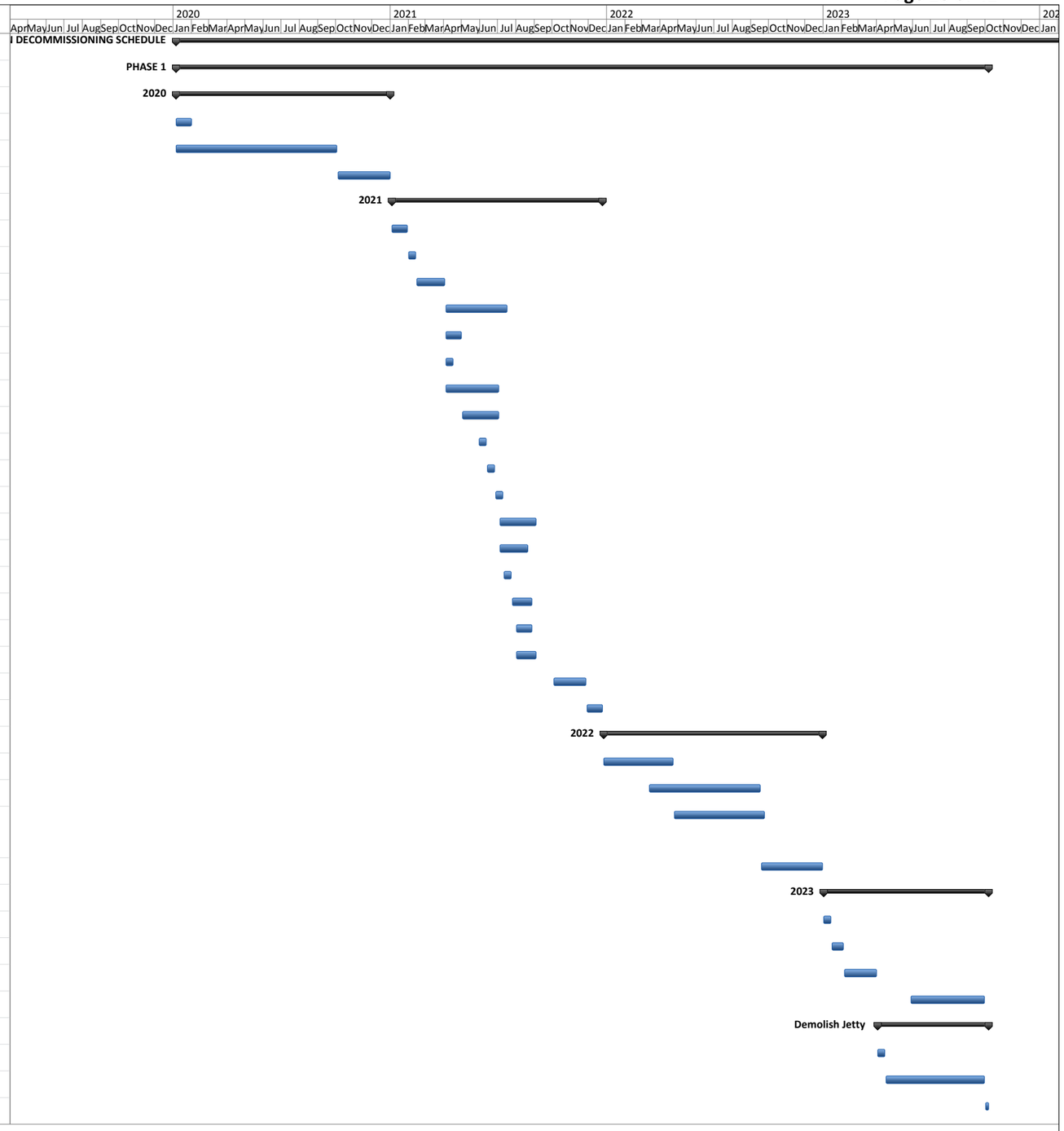
Jul 25, 2016 2:14pm jcrawford
C.A.D.

V:\1335\active\133547213\8_mechanical\3_drawing\133547213-SK001.dwg

# APPENDIX B

Decommissioning and Demolition Schedule

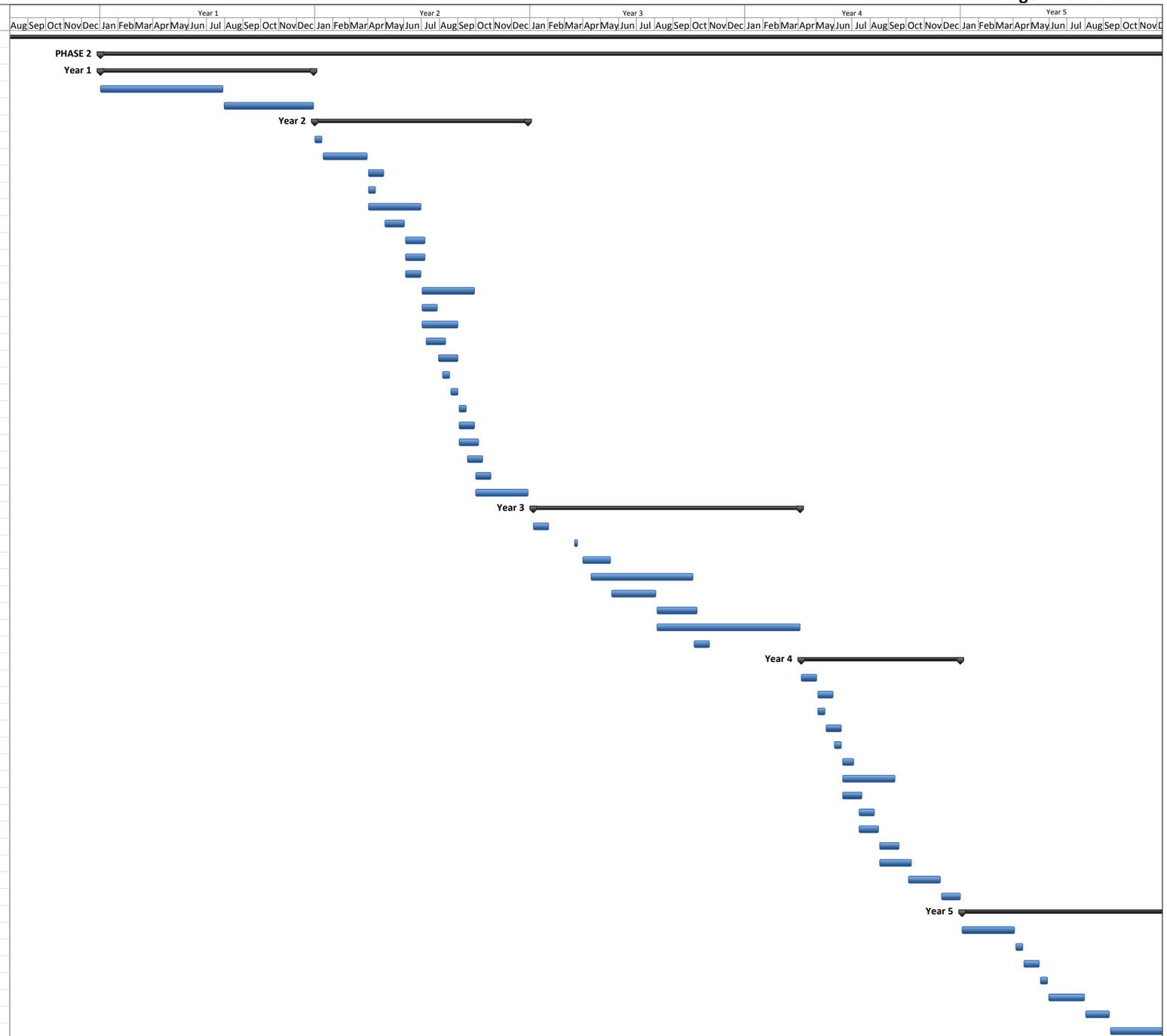
| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 1 | **HOLYROOD THERMAL GENERATING STATION DECOMMISSIONING SCHEDULE** | **7825 days** | **Mon 01/06/20** | **Fri 12/31/49** |
| 2 | **PHASE 1** | **980 days** | **Mon 01/06/20** | **Fri 10/06/23** |
| 3 | **2020** | **259 days** | **Mon 01/06/20** | **Thu 12/31/20** |
| 4 | Submit Closure Plan and Register Project with Environment | 4 wks | Mon 01/06/20 | Fri 01/31/20 |
| 5 | Engineering & Spec Development, Tank Farm & Pipeline Demolition | 39 wks | Mon 01/06/20 | Fri 10/02/20 |
| 6 | Hydro Tender Process | 12.8 wks | Mon 10/05/20 | Thu 12/31/20 |
| 7 | **2021** | **255 days** | **Mon 01/04/21** | **Fri 12/24/21** |
| 8 | Hydro Tender Process (Continued) | 4 wks | Mon 01/04/21 | Fri 01/29/21 |
| 9 | Contract Signed | 2 wks | Mon 02/01/21 | Fri 02/12/21 |
| 10 | Contractor Submittal Period | 7 wks | Mon 02/15/21 | Fri 04/02/21 |
| 11 | Hydro Bulk Chemical Removal, Chemical Sweep, Drain Bunker C fuel, Trip Power to Select Equipment | 15 wks | Mon 04/05/21 | Fri 07/16/21 |
| 12 | Hydro - Pumpout Bunker C Tanks | 4 wks | Mon 04/05/21 | Fri 04/30/21 |
| 13 | Clean Day & Fuel Additive Tanks | 2 wks | Mon 04/05/21 | Fri 04/16/21 |
| 14 | Drain & Clean Pipeline | 13 wks | Mon 04/05/21 | Fri 07/02/21 |
| 15 | Clean Bunker Tanks 1 Through 4 | 9 wks | Mon 05/03/21 | Fri 07/02/21 |
| 16 | Demolish Day and Fuel Additive Tanks | 2 wks | Mon 05/31/21 | Fri 06/11/21 |
| 17 | Clean Day Tank Pad Walls & Foundations | 2 wks | Mon 06/14/21 | Fri 06/25/21 |
| 18 | Demolish Day Tank Pad Walls | 2 wks | Mon 06/28/21 | Fri 07/09/21 |
| 19 | Demolish Pipeline | 9 wks | Mon 07/05/21 | Fri 09/03/21 |
| 20 | Demolish Bunker Tanks 1 Through 4 | 7 wks | Mon 07/05/21 | Fri 08/20/21 |
| 21 | Demolish 10 MW CT | 2 wks | Mon 07/12/21 | Fri 07/23/21 |
| 22 | Drain Transformers | 5 wks | Mon 07/26/21 | Fri 08/27/21 |
| 23 | Clean Tank Foundations | 4 wks | Mon 08/02/21 | Fri 08/27/21 |
| 24 | Disassemble Transformers & Remove From Site | 5 wks | Mon 08/02/21 | Fri 09/03/21 |
| 25 | ESA, Entire Site Except Transformers, #2 Oil Tanks & Yard North of Stacks | 8 wks | Mon 10/04/21 | Fri 11/26/21 |
| 26 | Prepare Tender & Award for Remedial Work (If Required) & To Convert Tank Farm to C&D Site | 4 wks | Mon 11/29/21 | Fri 12/24/21 |
| 27 | **2022** | **265 days** | **Mon 12/27/21** | **Fri 12/30/22** |
| 28 | Prepare Tender & Award for Remedial Work, If Required & To Convert Tank Farm to C & D Site (Continued) | 17 wks | Mon 12/27/21 | Fri 04/22/22 |
| 29 | Prepare Tender Stack & Jetty Demoltion | 27 wks | Mon 03/14/22 | Fri 09/16/22 |
| 30 | Site Remedial Work (If Required) And Convert Tank Farm To C&D Site, Laydown Fabric & Pit Run Gravel North Of Stacks (If Required) | 22 wks | Mon 04/25/22 | Fri 09/23/22 |
| 31 | Hydro Tender Process | 15 wks | Mon 09/19/22 | Fri 12/30/22 |
| 32 | **2023** | **200 days** | **Mon 01/02/23** | **Fri 10/06/23** |
| 33 | Hydro Tender Process (Continued) | 2 wks | Mon 01/02/23 | Fri 01/13/23 |
| 34 | Contract Signed | 3 wks | Mon 01/16/23 | Fri 02/03/23 |
| 35 | Contractor Submittal Period | 8 wks | Mon 02/06/23 | Fri 03/31/23 |
| 36 | Drop Stacks & Demolish Breeching | 18 wks | Mon 05/29/23 | Fri 09/29/23 |
| 37 | **Demolish Jetty** | **135 days** | **Mon 04/03/23** | **Fri 10/06/23** |
| 38 | Install Silt Curtain | 2 wks | Mon 04/03/23 | Fri 04/14/23 |
| 39 | Demolish Jetty / Access Bridge | 24 wks | Mon 04/17/23 | Fri 09/29/23 |
| 40 | Remove Silt Curtain | 1 wk | Mon 10/02/23 | Fri 10/06/23 |




Project: sch_pvs_25072016_rev1.
Date: Mon 07/25/16

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Task | Summary | External Milestone | Inactive Summary | Manual Summary Rollup | Finish-only |
| Split | Project Summary | Inactive Task | Manual Task | Manual Summary | Deadline |
| Milestone | External Tasks | Inactive Milestone | Duration-only | Start-only | Progress |

| ID | Task Name | Duration |
|---|---|---|
| 1 | **HOLYROOD THERMAL GENERATING STATION DECOMMISSIONING SCHEDULE** | **7825 days** |
| 41 | **PHASE 2** | **1305 days** |
| 42 | **Year 1** | **260 days** |
| 43 | Engineering & Spec Development, Powerhouse Demolition | 30 wks |
| 44 | Hydro Tender Process | 22 wks |
| 45 | **Year 2** | **260 days** |
| 46 | Contract Signed | 2 wks |
| 47 | Contractor Submittal Period | 11 wks |
| 48 | Hydro Remove Bulk Chemicals | 4 wks |
| 49 | Hydro Chemical Sweep | 2 wks |
| 50 | Abatement, Unit 1 Boiler | 13 wks |
| 51 | Drill Low Points & Drain Oil and Chemical, Remove Haz Mat Items - Unit 2 B/B | 5 wks |
| 52 | Drill Low Points & Drain Oil and Chemical, Remove Haz Mat Items - Unit 3 B/B | 5 wks |
| 53 | Hyrdo Wash Turbine Building & Other Plant Areas | 5 wks |
| 54 | Drain Transformer Oil & Remove From Site | 4 wks |
| 55 | Abatement, Unit 2 Boiler | 13 wks |
| 56 | Hydro Wash Boiler 1 | 4 wks |
| 57 | Shipout Transformer | 9 wks |
| 58 | Drill Low Points & Drain Oil and Chemical, Remove Haz Mat Items - T/G | 5 wks |
| 59 | Drill Low Points & Drain Oil and Chemical, Remove Haz Mat Items - Unit 1 B/B | 5 wks |
| 60 | Clean #2 Tanks & Pads | 2 wks |
| 61 | Demolish #2 Tanks | 2 wks |
| 62 | Phase 2 ESA Transformer & #2 Oil Tank Area | 2 wks |
| 63 | Abatement, Vacc Clean System & Transite | 4 wks |
| 64 | Drill Low Points & Drain Oil and Chemical, Remove Haz Mat Items - Common | 5 wks |
| 65 | Possible Remediation Transformer & #2 Oil Tank Area | 4 wks |
| 66 | Hydro Wash Boiler 2 | 4 wks |
| 67 | Abatement, Unit 3 Boiler | 13 wks |
| 68 | **Year 3** | **325 days** |
| 69 | Hydro Wash Boiler 3 | 4 wks |
| 70 | Hydro Plug Floor Drains | 1 wk |
| 71 | Galbestos Removal T/B | 7 wks |
| 72 | Demolish T/B | 25 wks |
| 73 | Galbestos Removal B/B | 11 wks |
| 74 | Dispose of Crushed Concrete in C&D Site | 10 wks |
| 75 | Demolish B/B | 35 wks |
| 76 | Drop B/B | 4 wks |
| 77 | **Year 4** | **194 days** |
| 78 | Clean Powerhouse Trenches | 4 wks |
| 79 | Clean Buried Piping | 4 wks |
| 80 | Galbestos Removal Stage 2 CW Pumphouse | 2 wks |
| 81 | Demolish CW Pumphouses | 4 wks |
| 82 | Dewater Leachate Lagoon | 2 wks |
| 83 | Backfill Leachate Lagoon | 3 wks |
| 84 | Backfill Below Grade Structures & Burried Pipe | 13 wks |
| 85 | Hydro Staff Move Sludge To Landfill | 5 wks |
| 86 | Cap Hazardous Waste Landfill | 4 wks |
| 87 | Demolish WWTP and EQ Basins | 5 wks |
| 88 | Phase 2 ESA, Yard North Of Stacks | 5 wks |
| 89 | Cap Tank Farm C&D site | 8 wks |
| 90 | Engineering & Tender Preparation, Remediation Of Yard North Of Stacks | 8 wks |
| 91 | Hyrdo Tender Process | 4.8 wks |
| 92 | **Year 5** | **260 days** |
| 93 | Hydro Tender Process (Continued) | 13 wks |
| 94 | Sign Contract | 2 wks |
| 95 | Contractor Submittal Period | 4 wks |
| 96 | Open Cap In Hazardous Waste Landfill | 2 wks |
| 97 | Remediate Yard North Of Stacks | 9 wks |
| 98 | Close Cap, Hazardous Waste Landfill | 6 wks |
| 99 | Environmental Closure Reporting | 15.8 wks |




Project: sch_pvs_25072016_rev1.
Date: Mon 07/25/16

Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | Deadline | Progress

# APPENDIX C

Decommissioning and Demolition Methodology

# HOLYROOD THERMAL GENERATING STATION DECOMMISSIONING

# DEMOLITION METHODOLOGY

# APPENDIX C

## A) Phase 1 - April to December, 2021

1. Hydro staff will drain and collect bulk chemicals, fuel additive and lube oils from the plant equipment not required to maintain synchronous condenser operations or plant building integrity. These will be removed from site by a local disposal/recycle contractor.

2. Fyrquel will be drained by hydro staff and returned to the supplier.

3. Surplus recoverable Bunker C fuel will be drained from the fuel feed system by hydro staff to the extent possible and will be removed from site by a local disposal/recycle contractor.

4. Hydro staff will collect containers of surplus chemical, oils, paints and like products and have them removed from site by a local disposal/recycle contractor.

5. Hydro staff can trip power feeds to various disused pieces of equipment.

6. Completing items 2 through 6 above will result in the plant being in a safer condition from the standpoint of potential spills or accidents and fire loading.

7. Demolish all 4 Bunker C storage tanks. Assume that the contents of the tanks have been consumed to the 3 foot level. A local contractor will set up temporary piping and pumping to transfer the remaining useable bunker from the tanks to tanker trucks for sale to an offsite user. The oil level will be dropped to the sludge level which is expected to be at approx. the 1 foot level. Tanks will be cleaned by a local cleaning sub- contractor. Waste oil and sludge to be disposed of off site locally. Demolition will be by excavators with shear attachments. Plates will be sold for scrap in large sizes cut to suit trucking, not reduced to 5 foot and under. Debris will be stockpiled in the South West corner of the tank farm until this area is converted to a C&D landfill.

8. In the Fall, once the tanks have been removed from the tank farm a Phase 2 environmental assessment will be performed. Any remedial work required as well as required modifications to convert the tank farm area into a C and D landfill will be completed in 2022.

9. Day tank and fuel oil additive tanks will be demolished in a similar fashion to the large storage tanks. The concrete dike will be cleaned by steam cleaning or pressure washing and the walls will be broken to grade using excavators with crusher attachments and rock hammers. A vacuum truck will be used to remove wash water which will be disposed of offsite.

10. The bunker fuel piping system will be drained, flushed and cleaned using steam or high pressure washing and vacuum trucks from the tanker unloading arms on the jetty through to the burner fronts of all 3 units. As has been done in the past the line will be cleaned in 100 foot sections with coupons cut into the piping for cleaning wand access. Contaminated wash water will be collected in a vacuum truck for offsite disposal. The fuel pumps and heaters will be cleaned as well.

11. The piping system from the jetty to the South wall of the powerhouse will be removed, along with the supports, to grade level. The open pipe ends will be capped.

12. A phase 2 ESA will be completed in the area of demolition and any remedial work required will be completed in 2022.

13. Unit 1 and 2 main output, station service and exciter transformers and T9 (unused old CT transformer) will be drained of oil, oil to be trucked to a recycle/disposal facility and transformer carcasses to be shipped off for salvage at a licensed facility. The main output transformers are a Transmission asset therefore they will determine the final disposal of this item.

14. Decommissioned CT to be demolished using excavators with shear attachments. The concrete pad will have holes punched in it using an excavator with a rock hammer attachment.

15. Debris from the above activities will be disposed of in the South West corner of the tank farm.

**B) <u>Phase 1 - 2022</u>**

1. Prior to demolition work taking place in the area between the stacks and EQ basins a 6" layer of backfill material will be placed over the yard. This will prevent any possible ground contamination from being spread over the plant site during demolition activities. A phase 2 ESA will be performed in this area after final plant demolition and any remediation required will be addressed at that time.

2. The tank farm area will be converted to a C and D landfill and any remediation required will be accomplished at this time.

**C) Phase 1 - 2023**

1. Jetty demolition will be accomplished using a barge with integral crane. This work will take place through the summer. Delay days due to weather will have to be factored in.

2. The piles will be cut below the deck manually with a diamond wire saw. It's expected the deck is strong enough it won't cantilever over and bind the cuts.

3. The crane will then take the load of a piece of deck to be sliced and the piece will be cut with a diamond wire saw. These pieces will be 3 feet thick. The cuts will be made perpendicular to the shoreline.

4. The pieces will then be lowered into the barge.

5. For the piles, an underwater team will cut the metal pipe perimeter and also the concrete filler if rebar is present. If there is no rebar then no concrete cutting is required. The pile will be snapped off.

6. The pile will be removed after it's cut or snapped and place in the barge.

7. The concrete will be disposed of in the old tank farm. The barge will come to shore where a shore based crane will load the pieces on trucks.

8. A silt curtain will be installed around the entire in-water works.

9. The stacks will be dropped towards the East. All stacks will all be dropped on the same day with a few hours delay between drops. The stacks will be prepped for blasting by cutting a mouth in each stack on the East side, similar to how a tree would be cut to fell it. Sections of wind shell will be left in the mouth and these will be drilled and filled with dynamite. Just prior to the blast the back of the stack will be cut horizontally along the bottom. Stack concrete will be pulverized and disposed of in the old tank farm. Stack liner will be processed for scrap and insulation will go to the tank farm C&D location.

10. The breeching exterior to the boiler house will be demolished prior to the stack drops. The bricks lining the breeching are expected to be contaminated with flue gas by products therefore these will be disposed of in the hazardous waste landfill. Siding will then be installed over the breeching openings.

**D) Phase 2 - Following Cessation of Synchronous Condenser Operations - Year 1**

1. Planning and engineering development.

**E) Phase 2 - Year 2**

1. Starting in April, Hydro staff will drain and collect bulk chemicals from the WTP and powerhouse and lube oils and no. 2 fuel oil from the plant equipment that was in operation. These will be removed from site by a local disposal/recycle contractor. The WWTP will be kept operational.

2. Hydro staff will collect containers of surplus chemical, ODS, firefighting gaseous agents, oils, paints and like products and have them removed from site by a local disposal/recycle contractor.

3. Hydro staff can trip power feeds to disused pieces of equipment. Lighting panels, receptacles and the elevator will be kept operational until the abatement is complete.

4. Approx. April, the demolition contractor (DC) will have mobilized to site and will start work.

5. Hydro staff work identified in 1 through 3 above will be performed concurrent with the abatement work proceeding. The various aspects of the work will be scheduled so that they don't interfere with each other.

6. The 2 outside no. 2 fuel oil tanks will be cleaned and demolished through the summer per methodology in items 8, 10 and 11 above. The pipeline supports will be cut at grade. Insulation will be disposed of in the tank farm C and D landfill.

7. Each boiler will be abated as a type 3 ACM job, one at a time in succession. This is expected to take 9 months total. If necessary the plant will have to be kept heated until all final lock down gluing is completed. Hydro will retain an asbestos monitoring company to oversee the health and safety of the work.

8. The vacuum cleaning piping is ACM contaminated so it will be removed in sections using glove bagging, sealed and disposed of at the Robin Hood landfill. As well the remaining non friable ACM under the MCC's will be removed and wrapped in plastic and placed in the tank farm C&D site.

9. Concurrent with abatement, the demolition contractor will be drilling low points and draining the residual fluids from all plant systems.

10. These systems will then be flushed and cleaned to the point that the piping is safe to work on and the scrap is not contaminated. Oily waste water will be collected and sent offsite for disposal.

11. Hydro staff will be washing the plant in areas that the contractor is not working in and will also wash the outside and the inside of the gas path of each boiler following abatement of each boiler. Wash water will be treated in the WWTP.

12. Hydro staff will have the ODS removed by a local contractor.

13. The demo contractor will also be removing plant lighting and disposing of hazardous bulbs as well as any mercury found or PCB filled bushings that may be found.

14. The DC will drain remaining liquid filled transformers, 4 in total, and dispose of the oil at a licensed facility. The transformer carcasses will then be shipped off site to a licensed cleaning and recycling facility. As mentioned above the Unit output transformers are a transmission asset.

15. As of year-end , except for washing the unit 3 boiler area, the plant should be washed clean, abated of friable ACM and ash contaminated insulation and be free of all PCB's, hazardous products oils and chemicals.

16. A phase 2 ESA will be completed in the no. 2 fuel tank and transformer areas and any remedial work required will be completed prior to cold weather.

**F) <u>Phase 2 – Year 3</u>**

1. In January hydro staff will finish washing the Unit 3 boiler and boiler building area.

2. Starting approx. April demolition will commence with the turbine building first. Any remaining galbestos siding will be removed by machine. As areas of the turbine hall become exposed demolition will proceed on the building structure using excavators, both high reach and regular, with shears and crusher attachments. Heavier thickness steel will be cut by hand using torches with staff on man lifts.

3. All equipment and concrete pedestals will be removed to grade. The crushed concrete will be disposed of in the C and D landfill. Demolition of the turbine hall should be complete by the end of September.

4. Once the turbine hall galbestos is removed the boiler building galbestos removal will be completed. Galbestos will be wrapped in plastic and landfilled in the tank farm C and D landfill.

5. Following demolition of the turbine building the boiler building will be prepped for explosive charges and the boilers and boiler building will be dropped South into the turbine hall. For preparation, the lower 2 floors will have all of the equipment totally removed using machinery and by hand with torches as required. The columns will be stripped of items attached to them. Cuts will be made in select columns and shaped charges will be installed to cut and blast the columns. All gas path scrap should be kept on the turbine and boiler building concrete pad until it is determined to be free of ash otherwise precipitation will produce contaminated runoff. Runoff from the pad areas can still be treated in the WWTP.

The runoff will collect in the various sumps in the powerhouse where it will be pumped via submersible pumps to the WWTP. When the boilers and building are down the scrap will be cut up and prepped for shipping.

6. Hydro staff will plug any drains that would allow contaminated water to be routed anywhere but the WWTP.

**G) <u>Phase 2 – Year 4</u>**

1. The timing of demolition of the WWTP and EQ basins has to be coordinated with the capping of the hazardous waste landfill and backfilling of the leachate pond.

2. Hydro staff will remove any remaining sludge in the WWTP, EQ basins and leachate pond and dispose of it in the hazardous waste landfill. A vacuum truck will be used for this purpose and dewatering of the sludge is not considered. This will be completed just prior to demolition of the WWTP and EQ basins.

3. Remaining buildings including the 2 CW pumphouses, the WWTP and EQ basin building will be demolished and backfilled. This work will start in May and the order of demolition will be the CW pumphouses first then the WWTP and EQ basins. The WWTP and basins must be left until last so any contaminated water can be treated. The galbestos siding on the stage 2 pumphouse will be removed first and deposited in the tank farm C&D site.

4. The hazardous waste landfill site will be capped starting in May and will be completed just after the last sludge is deposited.

5. The leachate lagoon will be dewatered to the WWTP just before it's demolished and the sludge and liner will be disposed of in the hazardous waste landfill. The leachate pond will then be backfilled and hydroseeded. Any contaminated water accumulating in the landfill will have to be disposed of off-site following this time period.

6. Buried piping will be exposed by excavation, removed or broken open and backfilled. Below grade structures will be backfilled. Concrete caps will be installed on the CW pumphouse inlets and CW discharge piping. Below grade structures include the CW pumphouses, EQ basins, seal pits, utilidors and oil separators.

7. Buried piping that is contaminated will be cleaned using similar equipment to that used for bunker pipeline cleaning. Waste water from heavy metal contaminated lines will go to the WWTP prior to its demolition. Oil contaminated lines will have the waste wash water disposed of off site.

8. A phase 2 ESA will be completed on the area North of the boiler building where the pumphouses and WWTP/EQ basins were.

9. The powerhouse floor trenches and sumps will be cleaned by the DC using steam or power washers and the contaminated wash water will be disposed of off site. The floor slab will have holes hammered in it to facilitate drainage.

10. Crushed concrete from the boiler house demolition will be disposed of in the C and D landfill.

11. The tank farm C and D site will be closed and capped in the fall.

**H) <u>Phase 2 – Year 5</u>**

1. Remediation will be completed as required in the area North of the boiler building.

# APPENDIX D

Site Project Management Staffing

# Appendix D

## Site Project Staff

| **A. Site Project Management Staff** | | |
|---|---|---|
| **Position** | **Year** | **Utilization** |
| Site Supervisor | Phase 1 - 2020 & 2023 and Phase 2 – Year 1 & Year 5 | 50% |
| | Phase 1 - 2021 & 2022 and Phase 2 – Years 2, 3,and 4 | 100% |
| Administrative Assistant | Phase 1 - 2020 & 2023 and Phase 2 – Year 1 & Year 5 | 50% |
| | Phase 2 - Years 2, 3, and 4 | 100% |
| Safety Specialist | Phase 1 - 2020 & 2023 and Phase 2 – Year 1 & Year 5 | 50% |
| | Phase 2 - Years 2, 3, and 4 | 100% |
| Plant Engineers x 2 | Phase 1 - 2020 through 2023 | 25% |
| | Phase 2 – Years 1 through 5 | 25% |

| **B. Site Project Plant Labour** | | |
|---|---|---|
| **Position** | **Staff Hours** | |
| | **Phase 1** | **Phase 2** |
| Shift Supervisor/Operators | 420 | 11,420 |
| Chemical Technicians/EMS Coordinators | 410 | 5,200 |
| Electricians | 180 | 1,460 |
| Utility/Labourers | 640 | 8,030 |

# APPENDIX E

Head Office Project Management Staffing

## Appendix E

## Head Office Project Staff

| Position | Utilization |
|---|---|
| Project Manager | 50% |
| Project Engineer x 2 | 50% |
| Environment Specialist | 25% |
| Safety/Hygienist | 10% |
| Communications Personnel | 5% |
| Scheduling | 5% |

These positions are required in Phases 1 and 2.

**Exhibit 9 - Working Capital Methodology**

REVIEW

# CASH WORKING CAPITAL: A REVIEW OF NEWFOUNDLAND AND LABRADOR HYDRO'S METHODOLOGY

*prepared for*
**NEWFOUNDLAND AND LABRADOR HYDRO**

*review conducted by*
**CHRISTENSEN ASSOCIATES ENERGY CONSULTING**

**June 23, 2017**

## INTRODUCTION

This report results from Christensen Associates Energy Consulting's review of the working capital methods of Newfoundland and Labrador Hydro (NLH, Company). Working capital is a key element of a utility rate base. *Cash working capital* is a component of overall working capital, and is the focus of this review. NLH's estimates of cash working capital requirements are based on the Lead-Lag approach, a longstanding methodology. The review of NLH's cash working capital methods is timely, as the most recent review of NLH's methods reaches several years back, first put in place during the 2001-02 timeframe.

*Working capital* generally refers to the financial resources necessary to fund day-to-day operations. Provided by investors, working capital is underwritten by the combined financial sources of investment employed by entities to fund all resources, including debt and equity financing vehicles. The resources funded by financial sources are revealed as net assets and include fixed capital and various short-term balance sheet elements supporting routine operations; cash, cash equivalents, and inventories are typical examples.

Viewed from the perspective of public utilities, working capital is a proper component of the utility's rate base[1] for both private entities and public organizations of all types. Below is a useful definition.

> "**Working Capital.** This term refers to various rate-base funding requirements other than the utility plant in service. These funding requirement[s] would include inventories, prepayments, minimum and compensating bank balances, cash working capital, and other

[1] A utility's rate base refers to the capital employed by public utilities in the provision of public service. A utility's rate base can be defined in several ways, but typically includes net plant (gross plant minus accumulated depreciation), materials and supplies inventory including fuel stock, and working capital. However, a utility's rate base can also include construction work in progress (CWIP), plant held for future use, customer deposits, deferred income taxes, investment tax credits, and regulatory assets. The utility's rate base is generally measured in original cost terms, but fair value and trended original cost metrics are also used worldwide.

non-plant operating requirements. When these assets or operating requirements are funded by investors, they are legitimate rate-base allowances." [2]

The notion of *necessary to fund operations* refers to the ongoing differences in the timing of remittances and revenues, and is often limited to cash working capital as a matter of definition. NLH's cash working capital is the topic of the immediate review. More precisely, cash working capital is the level of internal cash on hand that a utility must have available, each day, in order to bridge the gap between the points in time when expenditures are paid and revenues are received.

## METHODS TO MEASURE WORKING CAPITAL

Revenue inflows and remittance outflows are measured in terms of timeframe and level. The determination of cash working capital involves a study of the revenue and remittance timing gaps, each measured with respect to the point in time that the utility's services are delivered. Revenue timing gaps will consist of lags, more-or-less exclusively; on the other hand, remittance gaps will likely include both leads and lags. To the degree that revenue lags are greater than the net sum of the remittance leads and lags, cash working capital will be a positive amount.

While the conceptual basis for the inclusion of cash working capital within rate base is straightforward, determination of the amount involves empirical analysis and continues to be somewhat problematic, and potentially resource intensive. Consequently, alternative methods have been proposed and applied. Two general methods are used for determining the cash working capital amounts, *Default Values* and *Lead-Lag Studies*. Each is discussed below.

***Default Values as the Basis for Determining Cash Working Capital:*** Default value approaches provide the utility with cash working capital estimates that do not require extensive analysis and have attained regulatory acceptance.

***Formula Basis:*** The formula-based method sets cash working capital as the product of a default number of days and non-fuel operating and maintenance (O&M) expenses, including direct, administrative, and general expenses. This approach reaches back decades, first adopted by the Federal Energy Regulatory Commission (FERC) in 1939. In 1979, the FERC's Order 19A set cash working capital balances equal to 45/365, alternatively referred to as the *one-eighth of O&M* and the *45-day rule* (Rule).[3]

[2] Source: *Regulated Utilities Manual: A Service for Regulated Utilities,* c. 2012, Deloitte Development LLC., member of Deloitte Touche Tohmatsu Limited, p. 11.

[3] The one-eighth of O&M approach, otherwise referred to as the 45-day rule, remains contemporary, and is frequently applied by the FERC today including, for example, FERC Docket ER16-118-001 (January 19, 2016) regarding MISO. One-eighth of O&M, as approved by the FERC, is also referenced in several FERC electric tariffs, including that of International Transmission Company (ITC), Fourth Revised Volume No. 1. Earlier, in 2009, the

This approach has been widely adopted by regulatory authorities throughout North America where, in recent years, the Rule is applicable as a default value in the absence of a detailed lead-lag cash working capital study. Because the 45-day rule results in lag days that often exceed the lag periods suggested by formal studies, regulatory authorities in recent years have sometimes deemed shorter timeframes to be appropriates. As an example, in June 2015, the Ontario Energy Board (OEB) reduced the default days[4] for the cash working capital allowance applicable to electricity distributors from 13% (closely equivalent to 45 days) to 7.5%.

***Balance Sheet Basis:*** The balance sheet approach uses the net balances of current assets and current liabilities, as the basis to determine cash working capital amounts for utility rate bases.[5]

***Lead-Lag Approach to Cash Working Capital:*** Lead-lag studies explicitly account for and estimate the underlying lags in the revenue inflows and remittances covering operating expenditures.

The lead-lag methodology is a quantitative and widely preferred methodology, although the application of the methodology can be resource intensive as it involves the study of the leads and lags of actual, representative expenditure remittances (transactions). As an example, an electric utility engages an outside specialist/consultant under contract, to perform ongoing maintenance activities. The activities, viewed as inputs, are critical to the delivery of electricity services, and provided as ongoing service flows over typical months. Similarly, wholesale generation and transmission (G&T) services, viewed as outputs, are provided as ongoing flows of services to consumers by their utility. Each month's remittances are billed as inputs for consulting services and paid sometime thereafter. G&T services are measured (the read of meters), billed, and collected as revenues several days/weeks following the delivery of electricity (G&T services) to customers. In short, lags between the provision of services and payment flows are inherent to both input and output services: payments for contractor services would be remitted some time following the performance of the work (i.e., the realization of contractor services).[6] Similarly, revenues are realized with a lag, following the delivery of G&T services to consumers.

In brief, lead-lag studies involve the measurement of the leads and lags of the revenue receipts and the remittance payment. The cash working capital balance, incorporated in the rate base, is equal to the product of the various components of cash working capital and respective lead-lag days, measured as a

FERC utilized the one-eighth of O&M formula in the FERC Electric Tariff, Fifth Revised Volume No.1, for Westar under the Southwest Power Pool RTO (SPP), which covers the Southwest region of the Eastern Interconnection.

[4] The OEB, in its June 3, 2015 memorandum to All Licensed Electricity Distributors [and] All Interested Parties entitled *Allowance for Working Capital for Electricity Distribution Rate Applications*, cites several reasons for the reduction in allowance days, including the substantial completion of smart metering, wide adoption of automatic billing, customer information updates, and general process improvements. In other words, all changes are apparently attributable to reductions in revenue lags.

[5] Various reference materials will, on occasion, also mention a so-called *Rate Base Synchronization* method.

[6] Of note, the remittances for some inputs can take place prior to the receipt of the services.

share of an annual period (365 days), expressed as a percentage. The process to determine working capital balances for inclusion within rate base can be described as follows:

$$\textit{Working Capital Days}_H = \Sigma_M \textit{Transaction Weight}^H{}_M * (\textit{Lag Days}^H{}_M)$$

where,

$\textit{Working Capital Days}_H$ = *Working capital lead/lag days, expenditure category H*

$\textit{Transaction Weight}^H{}_M$ = *Amount for Transaction M, category H/* $\Sigma_M$ *Transactions M*

$\textit{Lead/Lag Days}_M$ = *Lead or lag days between point in time inputs are received and rendered, and payments are completed, for each transaction M*

The transaction weighted average days for category H, $\textit{Working Capital Days}_H$, is weighted by the amounts for each category H. This result is summed across categories H. In turn, the net of revenue and expenditure categories provides the net lead-lag days. Dividing by 365 days obtains the annual lead-lag percent, as applied to the annual total cash operating expenditures – i.e., cash outflows stated annually. This lead-Lag methodology is used by NLH to determine working capital balances for inclusion within its rate base, the technical application of which is assessed herein.

## NLH'S LEAD-LAG METHODOLOGY

The lead-lag analysis procedures employed by NLH are as follows:

***Revenue Lag:*** NLH provides G&T services to Newfoundland Power, Newfoundland's large retail electricity distributor, seven industrial customers,[7] and approximately thirty-nine thousand retail electricity customers in rural areas. In addition, NLH realizes revenue from the provision of services other than general retail electricity services. Other services include electricity services provided to the Department of Transportation and Works, transport services in the form of pole attachments for telecommunication companies and other communication revenue.

For purposes of determining cash working capital, the total revenue lag consists of *service*, *billing*, and *collection* components. In the NLH Lead-Lag Study, the total revenue lag is measured from the mid-point of the month. That is, NLH assumes that the flow of services over the course of the month occurs at a more-or-less constant rate of flow. In the case of electricity services, NLH can thus use the mid-point of the month (15.2 days prior to the end of the month) as the point in time that services are rendered. The results of NLH's analysis of revenue lags are shown below.

[7] Industrial customers include Corner Brook Pulp and Paper, North Atlantic, CFB-Goose Bay, Aur Resource Praxair, Vale Inco, IOCC, and Teck Resources.

**REVENUE LAG, NEWFOUNDLAND AND LABRADOR HYDRO**
**WORKING CAPITAL STUDY, 2015**

| Customer | Revenue ($ 000's) | % of Total | Lag Days | | | | Weighted Average Lag Days |
|---|---|---|---|---|---|---|---|
| | | | Service | Billing | Collection | Total | |
| Newfoundland Powe | 442,589 | 79.89% | 15.2 | 6.5 | 15.1 | 36.8 | 29.40 |
| Industrial Customers | | | | | | | |
| Corner Brook | 2,963 | 0.53% | 15.2 | 6.5 | 20.1 | 41.8 | 0.22 |
| North Atlantic | 11,485 | 2.07% | 15.2 | 6.5 | 16.9 | 38.6 | 0.80 |
| CFB - Goose Bay | 3 | 0.00% | 15.2 | 6.5 | 24.4 | 46.1 | 0.00 |
| IOCC | 3,670 | 0.66% | 15.2 | 6.5 | 18.0 | 39.7 | 0.26 |
| Teck Resources | 2,291 | 0.41% | 15.2 | 6.5 | 13.9 | 35.6 | 0.15 |
| Vale inco | 7,447 | 1.34% | 15.2 | 6.5 | 26.3 | 48.0 | 0.65 |
| Muskrat Falls | - | 0.00% | 15.2 | 4.0 | 0.0 | 19.2 | 0.00 |
| Praxair Canada | 1,930 | 0.35% | 15.2 | 6.5 | 16.3 | 38.0 | 0.13 |
| Rural | 78,025 | 14.08% | 15.2 | 8.0 | 22.1 | 45.3 | 6.38 |
| Other | 3,583 | 0.65% | 15.2 | 1.6 | 36.7 | 53.5 | 0.35 |
| TOTAL | 553,987 | 100.00% | | | | | 38.34 |

*Assessment:* NLH's method to determine revenue lags is correctly executed,[8] and would appear to obtain highly accurate results for much of NLH sales and revenues. Over 85% of total revenues are derived from sales to Newfoundland Power and large industrial customers (as listed above). As a result, NLH's lead-lag study does not appear to contend with sizable sampling error within the flows of G&T services and revenues. This review reveals that the collection lag days have been updated from the 2001-02 working capital study, thus reflecting the Company's contemporary lag experience. Similarly, the days for billing lags across the markets served (6.5, 4.0, and 8.0 days) reflect NLH updated sample of billing lag days compared to the previous working capital studies.

***Operating Expense Lags:*** Direct and indirect operations and maintenance (O&M) expenditures essentially cover non-capital resources, including expenditures for labor (wages and benefits), materials and supplies, and outside services. O&M expenditures can also include purchased power. These general expenditure categories include numerous types, covering a broad array of the various resource inputs used by utilities in the provision of service. For the purposes of the Company's lead-lag study, resource inputs and the invoices for them are grouped into common categories. Samples are then drawn from each category and analyzed. The end results are time lags, measured in days, between the points when

[8] NLH's methodology presumes that the flow of electricity services is delivered at a constant rate over the course of the month—thus, the midpoint days of 15.2. This is quite plausible, providing that the flow of electricity services is not systematically skewed favoring, over the course of twelve months, either the early days or the late days of the months. Absent empirical evidence to the contrary, the mid-point-of-month delivery assumption is appropriate.

resources are utilized in the provision of G&T electricity services, and the points when the compensation for the resource inputs are remitted.

Following this general theme, the O&M expenditure categories identified within the Company's lead-lag study include *salaries and benefits, materials maintenance, professional services, travel, transportation, office supplies, equipment rentals, insurance, property rentals, customer costs, power purchases,* and other sundry items referred to as *revenue recovery*. In turn, these categories have further detailed components. The 2015 expenditure and recovery lags of NLH's working capital are shown below.

**EXPENDITURE AND RECOVERY LAGS, NEWFOUNDLAND AND LABRADOR HYDRO WORKING CAPITAL STUDY, 2015**

| | Expenditures ($ 000's) | % | Lag Days | Weighted Average Lag Days |
|---|---|---|---|---|
| **Salaries & Benefits** | 93,307 | 43.53% | 12.5 | 5.4 |
| **Materials Maintenance** | 31,927 | 14.90% | 52.2 | 7.8 |
| **Professional Services** | 14,408 | 6.72% | 51.6 | 3.5 |
| **Miscellaneous** | 5,788 | 2.70% | 46.1 | 1.2 |
| **Travel** | 3,250 | 1.52% | 45.0 | 0.7 |
| **Transportation** | 1,649 | 0.77% | 45.0 | 0.3 |
| **Office Supplies** | 2,762 | 1.29% | 45.0 | 0.6 |
| **Equipment rentals** | 4,218 | 1.97% | 45.0 | 0.9 |
| **Insurance** | 2,508 | 1.17% | -145.5 | -1.7 |
| **Property rentals** | 1,497 | 0.70% | -30.0 | -0.2 |
| **Customer costs** | 253 | 0.12% | 0.0 | 0.0 |
| **Subtotal** | 161,567 | 75.38% | | 18.5 |
| **Recoveries** | | | | |
| **CF(L)Co Recoveries** | -1,701 | -0.79% | 30.0 | -0.2 |
| **External Recoveries** | -766 | -0.36% | 30.0 | -0.1 |
| **CDM Program deferral*** | 0 | 0.00% | 0.0 | 0.0 |
| **Interco vehicle fee** | -46 | -0.02% | 30.0 | 0.0 |
| **Interco fixed fee** | -581 | -0.27% | 30.0 | -0.1 |
| **NBD Admin Fee** | -4,812 | -2.25% | 30.0 | -0.7 |
| | -7,906 | -3.69% | | -1.1 |
| **Power Purchases** | 60,667 | 28.31% | 42.2 | 11.9 |
| **Total Cash Outflow** | 214,328 | 100.00% | | 29.4 |

* CDM program deferral has no lead/lag impact, as it is an accounting deferral entry

*Assessment:* The Company's cash working capital methodology covering non-fuel O&M expenditures is properly designed and well executed. The general approach for determining expenditure lags is sufficiently detailed and articulate, adhering to proper sampling procedures at a detailed level. For the various resource categories, moreover, the Company's study incorporates periodic updates and appears to adequately capture the lead-lag experience between the points in time when resource inputs are provided, and when compensation is received and remittances for resources have been completed.

## SUMMARY

The Company's general approach adheres to well accepted industry practices for determining its working capital requirements. Two points are worth highlighting. First, NLH updates its lead-lag study

from time to time, such that the study is contemporary, reflecting current conditions and expenditure patterns. Second, the Company employs well accepted practices to sample transactions[9] within defined expenditure categories. The Company's current lead-lag study reflects contemporary experience within small-sized categories within maintenance and non-payroll expenditures – an important consideration insofar as the transactions within these categories[10] may vary substantially from one updated study to another.

In closing, we wish to mention that the resource restructuring, currently underway. The completion of Muskrat Falls and the commence of charges for Labrador Island Link will likely have impact on the Company's working capital requirements. While the working capital methodology should remain unchanged, the lead/lag days will need to be revisited, and likely updated.

[9] The choice of sampling methodology is between random and stratified random sampling methods. As a starting point, the sample can presume that the underlying population of transactions assumes a uniform statistical distribution. Where the sample size of transactions within an expenditure category is skewed, with several large transactions dominating the total level, stratified sampling may well be the preferred approach.

[10] Selected expenditure categories include *Professional Services* (consultants, auditing, and legal groups), *Travel, Transportation, Office Supplies,* and *Equipment Rentals*.

**Exhibit 10 - Average Rate Base Methodology**

DISCUSSION PAPER

# RATE BASE METHODS FOR DETERMINING UTILITY RATES: CONSIDERATION OF ALTERNATIVES AND RECOMMENDATIONS

*discussion prepared for*
**NEWFOUNDLAND AND LABRADOR HYDRO**

*prepared by*
**Robert Camfield**
**Bruce Chapman**
**CHRISTENSEN ASSOCIATES ENERGY CONSULTING**

**July 16, 2017**

## INTRODUCTION

Recent conversations with Newfoundland and Labrador Hydro (NLH, Company) have precipitated two cost-of-service (COS) issues since the completion of the COS Methodology Review undertaken by Christensen Associates Energy Consulting last year. The two questions focus on the measurement of capital – essentially, the measure of plant in service for inclusion within the rate base of NLH.

*Valuation of capital* used by utilities in the provision of infrastructure services is not a new issue; indeed, capital valuation for setting utility rates has a rich institutional history.[1] Over recent decades, following several years of comparatively high inflation, the issue of valuation has settled on historical costs. At this point, original cost accounting is well accepted across North America for setting rates; cost theory serves only as background.

Decisions with respect to *rate base methodology* tend not to be concerns over theory so much as issues of business practice: matters of pragmatism and procedural process. Contemporary Issues of rate base methodology come down to practical concerns of frequency and timing of measurement of plant in service, for setting rates during future periods – say, the next two years forward. This discussion focuses on two specific questions regarding rate base methods, as follows:

1. How do utilities determine the value of their rate base for general rate applications? Does a generally preferred "frequency" of measurement of asset balances exist—a more-or-less commonly accepted approach by most utilities and regulatory authorities? Alternatively, do utilities apply a range of approaches? In short, is there a uniform

[1] For some time, regulatory jurisdictions used historical cost, often referred to as *Original Accounting Cost*, fair value, and other methods of capital valuation to determine the rate base and set rates for utility services. Utilities and regulatory authorities pretty much settled on original accounting cost during the years following the *Federal Power Commission v. Hope Natural Gas Company* decision of the U.S. Supreme Court (1944). Exceptions can be found. As an example, Order 154B of the Federal Energy Regulatory Commission applied a *Trended Original Cost* methodology for oil pipelines (1985).

accepted practice, or do utilities exercise a range of discretion about rate base methodology?

2. What are the main considerations for determining a utility's rate base? Should underlying circumstances including resource changes and markets served be accounted for, in decisions with respect to rate base methodology? More specifically what is the appropriate rate base approach for Newfoundland and Labrador Hydro in view of resource changes currently under way?

To provide guidance, we report herein our findings about how other utilities manage the above issues and, second, discuss how NLH should assess the problem of capital measurement (rate base) for determining utility rates in view of current resource plans.

Not surprisingly, these two questions emerge at a time when NLH is undergoing major resource restructuring, involving large additions to its rate base. For NLH, concern about rate base methodology stems from the limitations of NLH's current average balance basis of capital measurement in the face of large, within-period changes in asset value.[2] The total of gross and net asset value can increase dramatically when new, large plant assets are booked to plant-in-service accounts, thus assuming their position within a utility's rate base. In such cases, it is a matter of considerable importance that the rate base adequately captures the value of used and useful property employed in the provision of utility services.[3] In these circumstances, an average balance computation produces a value that is a combination of two very different numbers, and possibly undervaluing the rate base used to set rates over a forward period. Moreover, as we briefly touch on below, the approach to determining the weighted average cost of capital is tangentially related to rate base methodology.

## ANALYSIS

**Question 1: Rate Base Methods Used by Utilities:** To develop a more complete understanding of industry practices with respect to this topic, we interviewed the staff of a number of Canadian and U.S. utilities. We approached and received responses from several Canadian electric utilities. We also

[2] Resources used in the provision of electricity services are often characterized by capital indivisibility: investment in large generation and transmission infrastructure facilities, owing largely to scale economies. Under the twin conditions of original cost basis for utility prices and ongoing price inflation, such projects can cause rate base levels to rise dramatically. These conditions were present in Canada and the U.S. during the 1980s. At the time, many large nuclear stations (e.g., Darlington, Pickering, Comanche Peak, South Texas, River Bend, Seabrook, Wolf Creek, Diablo Canyon, Limerick, Millstone Three, Grand Gulf, Nine Mile Point Two) were being completed and entering commercial operation status, with the sponsoring utility rate base rising dramatically, often by a factor approximating twofold.

[3] At the point in time that facilities under construction become operational, the ongoing accrual of interest during construction ceases. Absent an immediate internal cash flow offset arising from higher flows of revenue, book as well as cash returns to capital can decline significantly, possibly resulting in a major shortfall in returns to equity shareholders.

received responses from several U.S. utilities, both large and small, in a variety of market and institutional circumstances—several utilities are members in ISO/RTO regions and some not; some investor-owned and some not—in response to the same questions as those submitted to the Canadian utilities. The survey participants appear in Table 1 below. One participant, the Ontario Energy Board, is not a utility but is a repository of in-depth regulatory information filed by the numerous electric distribution utilities of the Province of Ontario.

Ownership structure of participants varies widely. Canadian utilities are predominantly Crown corporations, though Ontario's distribution utilities are municipally owned to a large extent. We also interviewed staff at two investor-owned utilities in Canada. In contrast, American utilities interviewed were predominantly investor-owned, although U.S. survey participants include a municipal utility, a cooperatively-owned utility, and two government-owned utilities, one at the federal level and another at the state level (Santee Cooper, in South Carolina).

**Table 1**
**SURVEY PARTICIPANTS**

| **Canada** | | **United States** | |
|---|---|---|---|
| Utility | Entity Control | Utility | Entity Control |
| BC Hydro | Gov't | Georgia Power | Shareholders |
| Manitoba Hydro | Gov't | Duke Energy | Shareholders |
| SaskPower | Gov't | Duke Energy Carolinas | |
| Ontario - OEB | Gov't | Duke Energy Progress | |
| Hydro-Quebec | Gov't | Minnesota Power | Shareholders |
| Nova Scotia Power | Shareholders | Xcel Energy - MN | Shareholders |
| Newfoundland Power | Shareholders | Souhtern California Edison | Shareholders |
| | | Oklahoma Gas and Electric | Shareholders |
| | | Tennessee Valley Authority | Gov't - US |
| | | Santee Cooper | Gov't - State |
| | | Central Electric Power Coop | Cooperative |
| Gov't: Crown Corporation, Municipality | | Gov't - US: Corporate Agency of US Govt | |
| | | Gov't - State: State Action Agency | |
| | | Cooperative - Member-owned | |
| Shareholder: Investor-owned Utility | | | |

*Survey Results*

Survey respondents use a limited set of alternatives for developing rate base values. The survey uncovered use of three methods: 13-month average balances, beginning- and end-of-year (BOY/EOY) averaging, and end-of-year (EOY) balances approaches, although variations on the EOY method are in place. The incidence of application of these alternative approaches is presented in Table 2, below.

From the survey results, there appears to be no dominant valuation method within regions, or according to utility ownership structure, public or private.[4] In Canada, four utilities use a beginning- and end-of-year average, with the other three using other forms of averaging. Hydro-Quebec uses a 13-month average while SaskPower uses an end-of-year approach which takes account of developments over the course of the year, producing an averaging effect. Ontario distributors, on the other hand, have fairly broad discretion with respect to rate base measurement methodology, where the presumed objective is to accurately represent the value of assets present in rate base for an annual period.

**Table 2**
**FREQUENCY BASIS OF COMPUTATION OF RATE BASE**

| **Canada** | | | | |
|---|---|---|---|---|
| Utility | Entity Control | 13 mo. Average | BOY/EOY | EOY |
| BC Hydro | Gov't | | X | |
| Manitoba Hydro | Gov't | | X | |
| SaskPower | Gov't | | | Monthly Average |
| Ontario - OEB | Gov't | | | Various |
| Hydro-Quebec | Gov't | X | | |
| Nova Scotia Power | Shareholders | | X | |
| Newfoundland Power | Shareholders | | X | |
| Gov't: Crown Corporation or Municipality | | | | |
| Shareholders: Investor-owned Utility | | | | |
| **United States** | | | | |
| Utility | Entity Control | 13 mo. Average | BOY/EOY | EOY |
| Georgia Power | Shareholders | X | | |
| Duke Energy | Shareholders | | | EOY; Working |
| Duke Energy Carolinas | | | | Capital is 13-mo. |
| Duke Energy Progress | | | | Average. |
| Minnesota Power | Shareholders | | X | |
| Xcel Energy - MN | Shareholders | | X | |
| Southern California Edison | Shareholders | X | | |
| Oklahoma Gas and Electric | Shareholders | | | X |
| Tennessee Valley Authority | Gov't - US | | | X |
| Santee Cooper | Gov't - State | X | | |
| Central Electric Power Coop | Cooperative | X | | |
| Gov't - US: Corporate Agency of US Govt | | | | |
| Gov't - State: State Action Agency | | | | |
| Cooperative - Member-owned | | | | |
| Shareholders: Investor-owned Utility | | | | |

Operating size (MWh) appears to play a role in the determination of rate base methodology. In Ontario, for example, the preferences of electric distributors display a clear relation to size, where smaller

[4] Note that these results are related to rate case procedures. If a utility has a quarterly reporting obligation, a simpler 5-quarter average approach may serve regulatory reporting requirements well.

distributors are likely to employ beginning-and ending-balances, or end-of-year approaches. This relationship is not altogether surprising as smaller utilities may not close the books with monthly frequency, or because of software and data processing limitations. As a consequence, the beginning- and end-of-year average rate base method is favored. Larger utilities, on the other hand, tend to use 13-month (or 12-month) averaging. We note, however, that some small utilities also favor the 13-month approach.

In the United States, the 13-month average approach appears to be more widely used than in Canada, but is by no means universal, even among large utilities. For example, Xcel Energy in Minnesota uses a BOY/EOY approach and Tennessee Valley Authority uses EOY. The survey reveals anomalies driven by circumstances: for Duke Energy's operating companies in North Carolina, local tax considerations require the use of a 13-month average for working capital only.

Our prior expectations at the time of the survey were that, in view of the maturity of the industry, electric utilities would gravitate to a commonly accepted rate base valuation method, with the 13-month average method serving as the leading candidate. However, the capability to process data and information, mainly cost and revenue inputs, with sufficient expedition is a major constraint for many entities. These limitations are chiefly in the form of operating procedures and software—e.g., calculation of depreciation expense and net asset value for innumerable assets distributed across many asset classes.

Compared to the other two leading methods—average of beginning- and end-of-year values or end-of-year only—the 13-month method requires frequent entry of data and facilitating processes to manage accounting data with monthly frequency. As a consequence, the 13-month average approach better captures the value of capital used in the provision of services, at least over the course of the current year. Hydro-Quebec in Canada, and Georgia Power and Southern California Edison in the United States use this method. (Georgia Power's approach is mandated by its regulator, although Georgia Power also incorporates known and measurable cost changes within its general rate applications.) However, other large utilities across North America such as BC Hydro and Xcel Energy use alternative methods.

**Question 2: Consideration of Rate Base Methods for NLH:** The survey results reveal considerable variation, a consequence of context specificity. Context should be viewed broadly and, in addition to institutional legacy, can cover several important dimensions, including:

- the methods by which capital is measured, including either original cost or reproduction cost;[5]
- the path and abruptness with which plant-in-service balances are evolving;
- the timeframe for which rates are set; and,

[5] Reproduction costs net of depreciation, sometimes referred to as *fair value*, are not to be confused with replacement costs.

- offsetting changes in operating costs.[6]

In brief, the consideration of rate base methodology is highly case specific, with large mid-year changes in plant-in-service balances a central issue. This is particularly the case for small- to moderate-sized utilities. Large capital additions reflect capital indivisibility: major new facilities are often constructed in lumpy increments, necessary to realize economies of scale and least total costs over the long term. The lumpy nature of major capital additions is especially descriptive of power systems and including transmission and hydraulic generation facilities. Large capital additions are integral to the Company's current resource structuring process. Shown below are examples of new transmission facilities currently under development by NLH.

**Table 3**
**NEWFOUNDLAND AND LABRADOR HYDRO**
**EXAMPLES OF LARGE TRANSMISISON CAPITAL ADDITIONS**

| **Examples of Major Property Additions, 2017 - 2019** | | |
|---|---|---|
| Timeframe | New Facility | |
| October '17 | *230 kV Transmission Line - BDE to WAV* | |
| | TL267 Towers | $116,086,141 |
| | TL267 Tower Foundations | 70,252,741 |
| | TL267 Conductors | 36,113,920 |
| | TL267 Terminal Stations | 32,799,898 |
| | Total | $255,252,700 |
| February '18 | *230 kV Transmission Line - BDE to WAV* | |
| | TL267 Towers | $16,556,733 |
| | TL267 Tower Foundations | 10,019,765 |
| | TL267 Conductors | 5,150,731 |
| | TL267 Terminal Stations | 4,678,070 |
| | Total | $36,405,300 |
| February '18 | *230kV Trans Line-TL 272 - Soldiers PD to HWD* | |
| | Transmission Towers | $26,560,900 |
| | Total | $26,560,900 |
| December '18 | *Interconnection of MFA to HVY* | |
| | Transmission Towers | $11,756,950 |
| | Tower Foundations | 8,229,865 |
| | Conductors | 3,527,085 |
| | Total | $23,513,900 |

[6] Capital can substitute for energy and, to a lesser extent, non-fuel operations and maintenance expenses. This is manifested in changes in cost structure. Marked increases in plant-in-service balances – and thus rate base – resulting from, say, the introduction of sizable generation or transmission facilities are offset, significantly, by major declines in operating costs.

The above facilities are being installed within NLH's Island Integrated and Labrador Integrated systems, and are necessary for system reliability. Viewed in isolation, the expenditure levels for the new facilities are sizable, notably the third circuit interconnecting Bay d'Espoir with the West Avalon Substation (TL267). An equally discerning view is comparative: expenditure size of new additions gauged with respect to the net book value (depreciated original cost) of the current rate base, as presented below.

**Table 4**
**NLH EXPENDITURES FOR NEW TRANSMISISON FACILITIES**
**COMPARED TO CURRENT TRANSMISSION NET BOOK VALUE**

| | | Major Capital Additions, 2017 - 2019 | | |
|---|---|---|---|---|
| System | Total Rate Base (2019) | 230 kV Line - BDE to WAV | 230 kV Line - Soldiers PD to HWD | Interconnection of MFA to HVY |
| Island Intrcnt'd | $1,927,191 | $291,658 | $26,561 | |
| Labrador Intrcnt'd | $130,756 | | | $23,514 |
| % of Book Value | | 15.1% | 1.4% | 18.0% |

The above highlights the main concern: it is essential that rate base methodology fully account for large additions including, in the example, the *230kV Line - BDE to WAV* (referred to as TL 267) and *Interconnection of MFA to HVY* facilities. On the other hand, the *230 kV Line – Soldiers PD to HWD* facility (referred to as TL 266) is comparative small scale, and may be considered a normal addition, more-or-less.

However, not all additions give rise to abrupt increases in rate base. Much of capital investment is an ongoing gradual process involving modest-sized additions along with replacement of aged equipment and facilities. This process takes place at a more-or-less steady pace over years. If total invested capital (rate base) is evolving gradually and assumes a rising path through time, increased frequency of measurement of rate base – say, 13-month average – may well provide improved accuracy. However, measurement frequency is not much of an issue, and a beginning- and ending- balances approach may work fairly well under these conditions. The larger concern is the path of total capital, measured as net book value over the relevant timeframe, either an historical or forecast test period. Both 13-month and beginning- and ending balances are forms of averaging, and often will not adequately account for additions during a forward rate year, where capital additions are sizable such as those shown in Table 3.[7]

As alluded to above, the overarching consideration with respect to rate base methodology, is ensuring that *rates reflect the costs of utility services, at the time that services are provided.* In brief, NLH and the PUB should select and implement a methodology on the basis of whether or not used and useful capital is adequately accounted for. This criterion consists of two considerations: 1) the period for which the

[7] Note that sizable mid-year capital additions can include several moderate-sized facilities on similar schedules.

rate base is being calculated, and 2) how capital employed in the provision of services is captured in rates, during the relevant rate year.

New facilities enter commercial service at any point over the course of an annual period. Mid-year additions are not particularly problematic, providing they are modest-sized. The concern is with respect to large facilities: major facilities entering service mid-year, with corresponding large additions to the rate base can lead to a significantly understated rate base for setting rates over the forward rate year. To elaborate, presume an annual test period, for which an average rate base method is used to set rates over two or three forward years. A large capital addition enters service toward mid-year, and is thus accounted for in the test year-rate base, but only during months subsequent to commercial operation. The addition is not accounted for during months prior to time that the new facility is placed in commercial service, even though the new facility is providing services during all months of the forward year. Absent offsetting effects,[8] rates over the forward years are, by design, biased downward – a direct consequence of using average balances over the test year.

Simulation analysis can help guide the determination of rate base methodology, and is particularly useful for exploring the effects of large, mid-year capital additions under alternative rate base methods. For purposes of illustration, a brief simulation study is used to better address the central issue: how best to manage large, mid-year additions. The study estimates how well alternative rate base methods capture capital costs over a future rate period, where plant-in-service balances abruptly increase during a historical test period. The study considers a large capital addition taking place during the first half and, alternatively, second half of the test period. Four rate base methods are assessed: *Beginning and Ending Balances*, *13-Month Average*, *Annualization*,[9] and *End-of-Year Balances*. Simulation results appear in Table 5, below.

*(see following page)*

[8] Specifically, sizable increases in sales volumes can offset the understatement of the rate base.

[9] Annualization refers to an adjustment procedure under which mid-year additions and changes to plant-in-service balances are calibrated to full-year-of-service levels. As an example, if the test year is an annual period, a capital addition taking place at the beginning of October is moved to beginning-of-year – essentially, multiplying the change by a factor of four. Annualization is a form of adjustment to an observed historical rate base referred to as *known and measurable changes*.

**Table 5**
**ASSESSING ALTERNATIVE RATE BASE METHODS: INTRODUCING LARGE CHANGES TO PLANT-IN-SERVICE ACCOUNTS DURING MID-YEAR OF A HISTORICAL TEST PERIOD**

**RATE BASE***

*Large Investment During 1st Half of Historical Test Year*

| | Methodology ($ Million) | | | | |
|---|---|---|---|---|---|
| Plant In Service | Beginning and Ending Balances | 13-Month Averge | Year-End | Annualized | Rate Period: Average Over Forecast Year |
| Gross Plant | $553.5 | $578.5 | $607.0 | $598.1 | $618.8 |
| Accum. Depreciation | $308.1 | $307.9 | $316.3 | $308.3 | $325.5 |
| Net Plant | $245.4 | $270.5 | $290.8 | $289.8 | $293.2 |

*Large Investment During 2nd Half of Historical Test Year*

| | Methodology ($ Million) | | | | |
|---|---|---|---|---|---|
| Plant In Service | Beginning and Ending Balances | 13-Month Averge | Year-End | Annualized | Rate Period: Average Over Forecast Year |
| Gross Plant | $553.5 | $539.2 | $607.0 | $598.1 | $618.8 |
| Accum. Depreciation | $307.5 | $307.3 | $315.1 | $308.3 | $324.3 |
| Net Plant | $246.0 | $232.0 | $291.9 | $289.8 | $294.4 |

*Plant Additions, Historical Test Year*

| Annual Additions | $ Million |
|---|---|
| Regular | $22.0 |
| Large | $85.0 |

* Note that, in the simulations, net plant is used as a surrogate for rate base

As shown above, the End-of-Year and Annualization (Annualized) methods appears to provide a more accurate reflection of the capital employed (rate base) during the rate year, which for these purposes is defined as the year following the test period.[10] For investment during the 1st half of the test year, net book value[11] for Year-End and Annualized methods is $290.8 and $289.8 million, respectively, which varies only slightly from the net book value ($293.2 million) during the rate year. Similarly for large investments during the 2nd half of the test year: net book value for Year-End and Annualized methods of $291.9 and $289.8 million, respectively, closely approximates net book value for the rate year of $294.4 million. In both cases, average methods – 13-month average balances in the example – general tend understates net book value during the rate year by approximately $20 million in the case of the large investment entering service during the 1st half of the test year, and by approximately $62 million in the case of major investment entering service during the 2nd half of the test year.

[10] Note that the simulations do not take account of evolution in general sales volumes. Depending on circumstances, it may be appropriate to adjust the above analysis for expected changes in sales levels over time.

[11] Differences in measures of net book value would carry through to differences in measurement of the rate base, as other rate base elements would be held virtually unchanged.

It is useful to mention that this approach, Annualization, has precedence in the Province of Newfoundland and Labrador. In Order P.U. 22 of 2017 regarding NLH's 2013 General Rate Application Amended, the Board of Public Utilities (Board, PUB) authorized a full 12-month coverage of the capital charges on the Company's Holyrood gas turbine generating unit for rate setting purposes commencing in 2016 because it was in service for all of 2016. Whereas, the asset was only partially recovered during 2015 using the opening and closing method because it went into service in February 2015.

*Capital Structure:* As alluded to above, determination of the weighted average cost of capital (WACC), for purposes of setting rates, is related to rate base methodology. However, the relationship is only tangential, where the criterion "rates reflect the costs of utility services at the time that services are provided" is controlling. The carrying charges on capital – i.e., net rate base – are the product of the rate base and the WACC, and represent a large share of total costs. As a matter of consistency, it is often appropriate to determine a utility's WACC in a manner that aligns with the its determination of the rate base. Thus, if the rate base is based on 13-month average asset balances, the WACC may reflect monthly capital structure balances; similarly, beginning-of-year and end-of-year balances may be used, both for determining the rate base and the capital structure within the WACC.

The symmetry of method for determining the rate base and capital structure may not always hold. It is a matter of circumstances, and the best approach may vary from one General Rate Application to another. Much depends on financing activities and plans. Indeed, methodology symmetry may selectively break down, causing non-trivial differences between recovery of the charges on capital in rates and the weighted average cost of capital at the time that services are provided. This is particularly the case where, again, invested capital for large resource additions is introduced into rate base.[12] The WACC over the forward year, when the new facility is operating – and the capital addition is in rate base – may be substantially different from that observed for a recent historical period, particularly when the history involves construction and the mix of financing vehicles used to underwrite the investment has, at the time of commercial operation, has changed.

Similar to the approach used to gauge rate base methods, we draw on simulation analysis to illustrate and assess the effects of alternative capital structure methods. The issue at hand is the accuracy afforded by alternative capital structure methods to capture the weighted average cost of capital during

[12] Short-term debt is often used to finance large facilities during construction. Once new facilities under construction transition to commercial operating status, sizable balances of short-term debt may have accumulated, as short-term debt (or other forms of debt financing) are often used to help carry the facility projects over the course of construction. When operating status is reached – with the associated investment introduced into rate base – accumulated short-term debt balances are then rolled over into new issues of long-term mortgage debt, and infusions of equity also. In brief, sizable balances of short-term debt may be observed within the total balances of outstanding capital debt at the time of construction, with the expectation of rolling such amounts into long-term financing vehicles in the near term, perhaps only a few months forward. Also, the differences between short- and long-term interest rates – i.e., yield curve – vary from time to time; the relative level of short- and long-term rates may have impact on the schedule for conversion of short-term debt balances to longer-term financing vehicles.

the rate period, the consecutive twelve months immediately following a test period. As with the analysis of rate base methods, four capital structure methods are assessed: *Beginning and Ending Balances*, *13-Month Average*, *Annualization*, and *End-of-Year Balances*. The context, again, is the introduction of large increases to the plant-in-service balances during the first half and, alternatively, second half of the historical test period. Simulation results appear in Table 6, below.

**Table 6**
**ASSESSING ALTERNATIVE CAPITAL STRUCTURE METHODS: INTRODUCING LARGE MID-YEAR ADDITIONS TO A HISTORICAL TEST PERIOD RATE BASE**

**CAPITAL STRUCTURE**

*Large Investment During 1st Half of Historical Test Year*

| | Capital Structure Weights | | | | |
|---|---|---|---|---|---|
| Financing Vehicle | Beginning and Ending Balances | 13-Month Averge | Year-End | Annualized | Rate Period: Average Over Forecast Year |
| Short-Term Debt | 0.196 | 0.202 | 0.103 | 0.135 | 0.098 |
| Long-Term Debt | 0.401 | 0.399 | 0.443 | 0.434 | 0.440 |
| Equity | 0.402 | 0.399 | 0.454 | 0.431 | 0.462 |
| Total | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

*Large Investment During 2nd Half of Historical Test Year*

| | Capital Structure Weights | | | | |
|---|---|---|---|---|---|
| Financing Vehicle | Beginning and Ending Balances | 13-Month Averge | Year-End | Annualized | Rate Period: Average Over Forecast Year |
| Short-Term Debt | 0.202 | 0.297 | 0.114 | 0.135 | 0.110 |
| Long-Term Debt | 0.401 | 0.353 | 0.441 | 0.434 | 0.438 |
| Equity | 0.397 | 0.350 | 0.444 | 0.431 | 0.452 |
| Total | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

**WEIGHTED AVERAGE COST OF CAPITAL**

*Large Investment During 1st Half of Historical Test Year*

| | Beginning and Ending Balances | 13-Month Averge | Year-End | Annualized | Rate Period: Average Over Prompt Year |
|---|---|---|---|---|---|
| WACC | 5.72% | 5.69% | 6.12% | 5.95% | 6.16% |

*Large Investment During 2nd Half of Historical Test Year*

| | Beginning and Ending Balances | 13-Month Averge | Year-End | Annualized | Rate Period: Average Over Prompt Year |
|---|---|---|---|---|---|
| WACC | 5.68% | 5.31% | 6.05% | 5.95% | 6.09% |

Conclusions similar to those regarding rate base determination can be reached. The capital structure simulation results shown above suggest that, for determining rates over the prospective rate period, End-of-Year and Annualized methods better capture the weighted average cost of capital during the

forward rate year. In the case of large investment during the 1st half of the test year, Year End and Annualized methods obtain 6.12% and 5.95% WACC estimates, respectively, which closely approximate the average rate year level, 6.16%. Similarly under the 2nd half of year investment case, 6.05% and 5.95% WACC for Year End and Annualized methods, respectively, are near the 6.09% WACC level for the rate year.

In essence, it is appropriate for the rate setting process to review average methods (i.e., beginning- and end-of-year) for determination of the WACC. Other approaches may provide a more accurate reflection of the WACC during the prospective rate year. Changes to the WACC may be come about abruptly, as financings associated with major construction are manifested as capital structure changes, just as new additions enter rate base. Under such conditions, it is appropriate to consider the annualization of new financing vehicles such as long-term debt issues. However, major capital structure changes are highly case specific; in the context of setting rates over forward periods, variation from average balances to determine the capital structure is best handled on a case-by-case basis.

## SUMMARY

Our survey of Canadian and US electric utilities with respect to measurement of used and useful capital residing within the rate base found that the practices in play are highly varied, with no method dominant. The focus of the survey was frequency and point in time that utilities measure capital. The applied rate base methods include 13-month averages, beginning-of-year and end-of-year averaging, and end-of-year along with several variations. No pattern of geography, size, or corporate structure appears to be determinative of the method used. This suggests that NLH should exercise broad discretion in deciding how to value its rate base.

The central objective for rate base measurement is accurate coverage of the charges on capital used in the provision of services, while also not introducing significant reporting burdens. The 13-month average approach appears to be the better approach for taking account of ongoing, routine plant additions – in essence, reflecting a more-or-less steady evolution, or path, for plant-in-service balances over time. However, 13-month averaging may present procedural limitations, in view of the financial accounting systems currently in place. Moreover, with routine additions where the rate base assumes a steady and gradual path over time, the 13-month average approach may offer only limited improvement in measurement accuracy, compared to the beginning- and ending-balances methodology. For this reason, beginning- and end-of-year average may serve quite well and, along with 13-month average, appears to be widely employed by electric utilities.

Rate base measurement practices under routine conditions, where the path of plant-in-service balance changes is gradual, does not necessarily hold for cases in which large additions in rate base take place during mid- or late-year. Large additions, including both generation and transmission facilities, may give rise to a systematic understatement of plant-in-service balances over forward rate periods, if not properly handled. For large additions, utilities employ a variety of approaches to rate base methodology

and regulatory governance. It is generally more accurate to use either an end-of-period rate base or an average rate base adjusted for known and measurable changes (annualization). Such approaches should provide the means to properly measure the capital employed in the provision of electricity services over forward periods.

## RECOMMENDATION

It is recommended that Hydro and the Board adhere to the general principle: ensure coverage of the capital charges in rates at the time that capital is employed in the provision of services. To this end, Hydro and the PUB should continue to use opening and closing balances to determine the average rate base in the normal course of operation. In the event of significant capital additions, we recommend that Hydro and the PUB follow recent precedence of annualizing rate base associated with a sizable addition. As a general guideline, plausible threshold levels of investment subject to special treatment (end-of-period, annualization) appear to reside in the range of 5-7% of the cost of service systems' rate base. Second, should annualization be required for a capital addition, we recommend that the capital structure used to determine the WACC also be evaluated to gauge whether it is appropriate to annualize certain components of the capital structure.

**Exhibit 11 - 2016 Depreciation Study**

CONCENTRIC ADVISORS

October 5, 2017

Newfoundland and Labrador Hydro
Hydro Place, 500 Columbus Drive
P.O. Box 12400
St. John's, NL
A1B 4K7

Attention: Mr. Michael Conway, CA, CPA
Manager Regulatory Finance

Please find attached the revised 2016 Depreciation Study. The previous study had inadvertently included some incorrect wording, incorrect labeling of account titles in Section V and VI of the Depreciation Study report, and Tables 1A and Tables 1B were incorrect. This report now correctly reflects our recommendations and the calculations performed by the Company.

The following summarizes the changes.

- Revision date on the cover of the Depreciation Report changed to October 5, 2017.
- Introductory page, date changed to "October 5, 2017".
- Introductory paragraph added: "depreciation, the statistical analyses of service life and net salvage percentages and, the summary and detailed tabulations of annual and accrued depreciation."
- Signature block added: "Canada".
- Table of Contents: Various page numbers and description changes.
- Page IV, 1st paragraph, 2nd sentence "This recommendation is in response to a PUB…". Removed "Board" added "PUB"
- Page IV, last sentence: Removed "$.8M" and added "$0.8M".
- Part I, Page I-3, footnote4: Replaced "Utilities" to "utilities".
- Part I, Page I-4, middle of page. Paragraph added: "To recognize the early and complete….". This change and results are shown in Table 1A and 1B."
- Part I, page I-5, middle of first paragraph added: "NL Hydro currently records the removal…be charged to accumulated depreciation."

- Part I, Page II-12, Account G03 – Generators. First sentence investment composition changes from “4.1%” to “4.0%”.
- Part I, page I-7, first paragraph added: “expectation as NL Hydro is capitalizing a portion of the removal costs.”
- Part II, Page II-7, Account C13, first paragraph, removed: “ , the smaller communities are converting to electrical power sources so there is a need to upgrade conductor size.”
- Part II, Page II-12, first paragraph replaced “standby” to “stand by”.
- Part II, Page II-12, Account G03 replaced “4.1%” to “4.0%”.
- Part II, Page II-16, Account P05 deleted “Discussions and review with NL Hydro representatives indicated that there are no salt water issues and that the climate of NL Hydro’s territory is largely dry and cold resulting in less corrosive influences." New: “NL Hydro representatives suggest…”
- Part II, Page II-16, Account P07 – Poles – Wood. First paragraph sentence “Discussions and review with NL Hydro representatives indicated that a tower painting program is in force to extend the life. In addition, there are no salt water issues and that the climate of NL Hydro’s territory is largely dry and cold resulting in less corrosive influences” has been deleted.
- Part II, Page II-19, Account T04 – Towers. First paragraph sentence “Discussions and review with NL Hydro representatives indicated that a tower painting program is in force to extend the life. In addition, there are no salt water issues and that the climate of NL Hydro’s territory is largely dry and cold resulting in less corrosive influences” has been deleted.
- Part III, Page III-5. [Old]: "International Accounting Standard (“IAS”) #14."
  [New]: "IFRS 14." [Old]: "147."
  [New]: "14 7." (Footnote move to here)
  [Old]: "transactions 7 ," (switched where footnotes were)
  [New]: "transactions,"
- Part III, Page III-7, replaced “Combuster” with “Compressor”.
- Part IV, Page IV-2 , replaced “VI-3” to “VI-2”.
- Part IV, Page IV-3 to IV-10 – Tables 1A and 1B were incorrect and have been replaced in their entirety.
- Part V and VI, Account titles changed for:
  - Account D01 – Dams, Dykes, Canals and Tunnels
    - Pages V-75, V-76, and V-77
  - Account I02 – Instrumentation
    - Pages V-132, V-133, V134, and VI-59

- Account I03 – Insulators
  - Pages V-135, V-136, and V-137
- Account I04 – Intake Structures
  - Pages V-138, V-139, V-140
- Account I05 – Inverters
  - Pages V-141, V-142, V-143

- Part VI, pages VI-2 to VI-192, titles changed from “As of December 31, 2016” to “As of December 31, 2015”.

With the above changes, the attached report is correct to the best of our knowledge.

Sincerely,

CONCENTRIC ADVISORS ULC

Larry E. Kennedy
Vice President

LEK/bmw

# NEWFOUNDLAND AND LABRADOR HYDRO

## ST. JOHN'S, NEWFOUNDLAND

# 2016 DEPRECIATION STUDY

# CALCULATED ANNUAL DEPRECIATION ACCRUAL RATES APPLICABLE TO PLANT IN SERVICE

# AS OF DECEMBER 31, 2015

**Revised: October 5, 2017**

*Prepared by:*

CONCENTRIC ADVISORS

Calgary. Alberta

CONCENTRIC ADVISORS

September 15, 2017

Newfoundland and Labrador Hydro
Hydro Place, 500 Columbus Drive
P.O. Box 12400
St. John's, NL
A1B 4K7

Attention: Mr. Michael Conway, CA, CPA
Manager Regulatory Finance

Ladies and Gentlemen:

Pursuant to your request, we have conducted a review and assessment of the electric generation, transmission and distribution systems of Newfoundland and Labrador Hydro ("NL Hydro") as of December 31, 2015. Our report presents a description of the methods used in the estimation of depreciation, the statistical analyses of service life and net salvage percentages and, the summary and detailed tabulations of annual and accrued depreciation.

We gratefully acknowledge the assistance of NL Hydro personnel in the completion of the review.

Respectfully submitted,

CONCENTRIC ADVISORS CANADA ULC

LARRY E. KENNEDY, CDP
Vice President

LEK/
Project: 061170

## TABLE OF CONTENTS

Executive Summary ..... III
**PART I. INTRODUCTION** ..... I-1
Scope ..... I-2
Plan of Report ..... I-2
Basis of the Study ..... I-3
Depreciation ..... I-3
Service Life and Net Salvage Estimates ..... I-6

**PART II. DEVELOPMENT OF DEPRECIATION PARAMETERS** ..... II-1
Depreciation ..... II-2
Estimation of Survivor Curves ..... II-2
Survivor Curves ..... II-2
Survivor Curves and Net Salvage Judgments ..... II-3
NL Hydro Accounts ..... II-4

**PART III. CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION** ..... III-1
Calculation of Annual and Accrued Depreciation ..... III-2
Review of Conversion to a Group Accounting Method ..... III-2
Group Depreciation Procedures ..... III-3
International Financial Reporting Standards (IFRS) and Forecasting Purposes ..... III-4
Calculation of Annual and Accrued Amortization ..... III-6
Monitoring of Book Accumulated Depreciation ..... III-7

**PART IV. RESULTS OF STUDY** ..... IV-1
Qualification of Results ..... IV-2
Description of Detailed Tabulations ..... IV-2

Table 1A Estimated Survivor Curves, Original and Deemed Costs and Annual Accruals Related To Plant in Service as of December 31, 2015
- Life ..... IV-4

Table 1B Estimated Survivor Curves, Original and Deemed Costs and Annual Accruals Related To Plant in Service as of December 31, 2015
- Cost of Removal ..... IV-7

**APPENDIX 1 – ADDITIONAL EVIDENCE OF LARRY KENNEDY** ..... A1-1

**APPENDIX 2 – ESTIMATION OF SURVIVOR CURVES** ..... A2-1
Estimation of Survivor Curves ..... A2-2
Average Service Life ..... A2-2
Survivor Curves ..... A2-2
Iowa Type Curves ..... A2-2

## **TABLE OF CONTENTS**, Cont'd.

Retirement Rate Method of Analysis ..... A2-9
Schedules of Annual Transactions in Plant Records ..... A2-9
Schedule of Plant Exposed to Retirement ..... A2-12
Original Life Table ..... A2-14
Smoothing the Original Survivor Curve ..... A2-16

# NEWFOUNDLAND AND LABRADOR HYDRO
# DEPRECIATION STUDY

## EXECUTIVE SUMMARY

Pursuant to Newfoundland and Labrador Hydro's ("NL Hydro" or "Company") request, Concentric Advisors Canada ULC ("Concentric Advisors") conducted a depreciation study related to generation, transmission, distribution, and general plant accounts as of December 31, 2015.

Concentric Advisors is proposing changes from NL Hydro's last approved depreciation study. The first change is applicable to 2015 investment only. For all vintages up to and including 2014, depreciation rates are based on the straight line method using the Average Service Life (ASL) group procedure and applied on a remaining life basis consistent with the previous depreciation study. For current plant (i.e. 2015 vintage) the depreciation rates are based on the straight line method using the Equal Life Group (ELG) procedure and were applied on a remaining life basis. The calculations were based on attained ages and estimated average service life.

Secondly, this study makes provision for the recovery of the original cost of investment (net of anticipated gross salvage proceeds) and for the cost of removal[1] to be collected through depreciation expense, as compared to the current collection of cost of removal in the year of occurrence.

Third, to recognize the early and complete retirement of a large portion of the Holyrood Generating Station assets, the assets that are anticipated to be retired have been identified by NL Hydro and have been subjected to a truncation date of March 31, 2021. The truncation date results in a corresponding increase in each account's depreciation rate to reflect the complete recovery of the Holyrood assets that will be retired by the recommended truncation date of March 31, 2021. This change and results are shown in Table 1A and 1B.

Fourth, to recognize that NL Hydro utilizes deemed cost in its accounting systems for financial disclosure purposes, Concentric Advisors has developed deemed cost

[1] Does not include the expected costs of retirement that are included in Asset Retirement Obligation calculations

accrual rates for each depreciable account as shown on Tables 1A and 1B. For post 2015 additions Concentric Advisors recommends and has provided whole life accrual rates that do not reflect the booked depreciation deficiency or surplus position as of December 31, 2015. These deemed cost accrual rates will then ensure the accurate recovery of NL Hydro's deemed cost investment as of December 31, 2015.

Fifth, in this report Concentric Advisors recommends the conversion to a more traditional group accounting concept. This recommendation is in response to a PUB directive resulting from the last depreciation study and negotiated settlement application relating to the historical NL Hydro departure from the use of typical regulated group depreciation accounting. Concentric Advisors has prepared a report titled "Evidence of Larry E. Kennedy Related To The Conversion To Group Accounting Methods" which is attached as Appendix 1 to this report. This evidence discusses the issues and concepts related to Group Depreciation and provides a recommendation to convert to Group Depreciation accounting. Under Group Depreciation no gain or loss on disposal is recognized since the accumulated depreciation relates to the entire group rather than to specific assets within the group. This recommendation was used in the development of the depreciation rates that are determined in the Concentric Advisors Depreciation Study.

The effect of the proposed partial incorporation of the ELG procedure, the changes to the average service lives, the introduction of the recovery of cost of removal related to the final retirement of assets and the elimination of losses on retirements[2], when applied to 2015 original cost is an approximate $0.8M increase in annual depreciation expense as detailed below.

| | Expense | Change |
|---|---|---|
| Previous Parameters | $60,623,582 | |
| Life Parameter Change | $56,736,099 | -$3,887,483 |
| Net Salvage Change | $64,912,188 | $8,176,089 |
| ELG Change | $66,402,637 | $1,490,449 |
| Losses on Retirements[3] | | -$4,969,000 |

[2] Includes costs associated with loss on retirement, disposal costs, and salvage proceeds that were previously charged to NL Hydro's income statement.
[3] For the period 2012 to 2015.

| | |
|---|---|
| Total Change | $ 810,055 |

Concentric Advisors recommends the calculated annual depreciation accrual rates set forth herein as summarized by Tables 1A and 1B of the study by account detail. Supporting data and calculations are provided in Parts V and VI in the Supporting Documents.

# PART I. INTRODUCTION

# NEWFOUNDLAND AND LABRADOR HYDRO
# DEPRECIATION STUDY
# PART I. INTRODUCTION

## SCOPE

This report sets forth the results of the depreciation study for NL Hydro to determine the annual depreciation accrual rates and amounts for book purposes applicable to the original cost of NL Hydro's generation, transmission, distribution, and general plant assets as of December 31, 2015. The rates and amounts are based on the straight line remaining life method of depreciation. This report also describes the concepts, methods and judgments which underlie the recommended annual depreciation accrual rates related to the electric plant in service.

The service life and net salvage estimates resulting from the study were based on: consideration of current practice in the electric generation, transmission and distribution industry, including knowledge of service lives used for other electric utilities; a review of company practice and outlook as they relate to plant operation and retirement; a review of the company's upcoming capital and retirement projects; and informed professional judgment which incorporated analyses of historical plant retirement data as recorded through December 31, 2015.

## PLAN OF REPORT

Part I. Introduction, contains statements with respect to the plan of the report, and the basis of the study. Part II. Development of Depreciation Parameters, presents descriptions of the methods used and factors considered in the service life and net salvage studies. Part III. Calculation of Annual and Accrued Depreciation presents the methods and procedures used in the calculation of depreciation. Part IV. Results of Study, presents summaries by depreciable group of annual and accrued depreciation. The Additional Evidence of Larry Kennedy Related to the Conversion to Group Accounting Methods is presented in Appendix 1. An overview of Iowa curves and the Retirement Rate Analysis are set forth in Appendix 2 of the report. Parts V and VI of this report are found in the Supporting Documents. Part V presents the results of the Retirement Rate

and Service Life Statistics and detailed tabulations of annual and accrued depreciation are presented in Part VI.

## BASIS OF THE STUDY

### Depreciation

As mentioned in the Executive Summary, Concentric Advisors is proposing a change in procedure for current plant from the ASL procedure to the ELG procedure. Concentric Advisors is proposing a gradual phased in approach to the ELG procedure which will result in a more accurate alignment of the depreciation expense to the consumption of the service value of the assets providing utility service. The Board of Commissioners of Public Utilities (the "Board") has long accepted the better accuracy of ELG depreciation rates for Newfoundland Power. In the circumstances of Newfoundland Power, the Board first accepted ELG rates for new plant in their 1978 general rate hearing. Following the 1982 general rate hearing, the Board accepted that ELG rates would be used for all plant, and since 1983 the procedure has been in place for Newfoundland Power. Concentric Advisors recommends a similar gradual phased in process as described above in order to minimize the impact to current customers while implementing a change that will benefit future customers.

Other jurisdictions in Canada and the United States have also concluded that ELG procedure is the most appropriate depreciation procedure[4]. In the United States, more utilities use ASL, although ELG is still used in some states. However, in Canada the use of ELG is much more pronounced. The ELG procedure is widely accepted for depreciation rates in Canada, and is the long-standing practice of Newfoundland Power. Its use for more than three decades by Newfoundland Power provides a net benefit to current customers and the transition of NL Hydro to ELG provides a net benefit for future customers for NL Hydro as well.

The incorporation of ELG procedure in the depreciation rate calculation is in compliance with the International Financial Reporting Standards (IFRS) when using group

[4] In Canada, this includes most utilities in Alberta and Saskatchewan, in addition to Gaz Metro and Yukon Electrical Company Limited

accounting methods. External Auditors have generally been very accepting of the group accounting process when the ELG procedure is used by utilities reporting under the IFRS. The acceptance is based on the better and proper matching of the depreciation expense to the consumption of service value of the assets with the ELG procedure. Both the ASL and ELG procedures will result in 100% recovery of original costs. However, the ASL procedure utilizes an averaging principle which under recovers the original cost on assets that retire prior to the average service life while over recovering the original cost on assets that retire after the average service life. This inherent assumption results in an under recovery during the early years of a fixed asset account (or UOP) compensated by an over recovery in the later years but still reflecting complete recovery over the fixed asset account's life. The ELG procedure, however, recognizes that some assets retire before and after the average service. By recognizing the actual physical life retirements through its inherent calculations, the ELG procedure more accurately reflects each asset's original cost recovery to its physical life.

To recognize the early and complete retirement of a large portion of the Holyrood Generating Station assets, the assets that are anticipated to be retired have been identified by NL Hydro and have been subjected to a truncation date of March 31, 2021. This represents a small update from the previous Depreciation study where a truncation date of 2020 was identified. The current truncation date results in a corresponding increase in each account's depreciation rate to reflect the complete recovery of the Holyrood assets that will be retired by the recommended truncation date of March 31, 2021. This change and results are shown in Table 1A and 1B.

For most accounts, the annual and accrued depreciation were calculated by the straight line method ASL procedure for all vintages up to and including 2014 and the straight line method ELG procedure for 2015 vintages. For certain General Plant accounts, the annual and accrued depreciation are based on amortization accounting. Amortization accounting is used for certain General Plant accounts because of the disproportionate plant accounting effort required to track small assets in these accounts. Many regulated utilities in North America have received approval to adopt amortization accounting for these accounts. All the calculations were based on original cost, attained ages, and estimates of service lives and salvage.

This study also recommends the incorporation of the anticipated cost of removal within the depreciation rate calculations. However, the cost of removal percentage recommendations were moderated to ensure continuity of the past practices of NL Hydro. NL Hydro policy is to capitalize site preparation costs to the new assets in replacement projects. NL Hydro has indicated that they will continue with this practice which results in a less cost of removal percentage as compared to a number of the industry peers including Newfoundland Power. The NL Hydro policy reflects the IFRS view that the replacement of an asset is dependent upon the removal of the existing asset and thus should be capitalized to the new replacement asset. However, if there are no replacement assets (i.e. meaning replacement in the exact same location), NL Hydro currently records the removal costs to an income statement account in the year occurred. This practice has required that the removal entries be forecast for all test periods which requires estimation and inclusion in the test year's revenue requirement. Given the current practices requirement to estimate forecast removal costs, there exists a potential of material over or under recovery of NL Hydro's net income. Therefore Concentric Advisors recommends that cost of removal be charged to accumulated depreciation. The inclusion of an allowance for cost of removal in this manner provides for the proper matching of expenses to revenues, without any double counting of the estimates in revenue requirement request. The recovery of cost of removal in the depreciation rates is widely accepted throughout North America[5], including Newfoundland Power for many decades. Delaying collection until such costs are incurred results in a charge to customers for plant from which they did not receive service and, as a result of the delay in recovery, also results in higher revenue requirements related to cost of removal. The appropriateness and accuracy of including cost of removal into NL Hydro's rates should be reviewed during each depreciation study to ensure they reflect that the most up to date information has been incorporated into net salvage rate development.

Gross salvage (i.e. proceeds upon retirement) have been incorporated into the Life component of depreciation rates (i.e. Table 1A-Life) and cost of removal (i.e. removal

[5] For example, Canadian jurisdictions such as Alberta, British Columbia, Saskatchewan, Manitoba, Ontario, Quebec, Northwest Territories, Nova Scotia, and many jurisdictions in the United States.

expenditures upon retirement) into the Cost of Removal component of depreciation rates (i.e. Table 1B-Cost of Removal). This delineation of gross salvage and cost of removal is consistent with financial disclosure requirements of IFRS.

**Service Life and Cost of Removal Estimates**

The service life and cost of removal estimates used in the depreciation and amortization calculations were based on informed professional judgment which incorporated a review of management's plans, policies and outlook, a general knowledge of the electric utility industry, and comparisons of the service life and cost of removal estimates from our studies of other electric utilities. The use of survivor curves to reflect the expected dispersion of retirement provides a consistent method of estimating depreciation for electric plant. Iowa type survivor curves were used to depict the estimated survivor curves for the plant accounts not subject to amortization accounting.

The procedure for estimating service lives consisted of compiling historical data for the plant accounts or depreciable groups, analyzing this history through the use of widely accepted techniques, and forecasting the survivor characteristics for each depreciable group on the basis of interpretations of the historical data analyses and the probable future, which included reviews of detailed upcoming project business cases and operational staff interviews. Additionally, detailed asset retirement information (where known) for upcoming retirement projects was incorporated into the data files for the analysis of average service life. The combination of the historical experience and the estimated future yielded estimated survivor curves from which the average service lives were derived.

The procedure for estimating cost of removal considered to a large extent the approved cost of removal parameters for Newfoundland Power's 2015 depreciation study. However, due to differing accounting policies related to cost of removal between NL Hydro and Newfoundland Power, adjustments to NL Hydro's recommended cost of removal were required. Since at least the early 1980's, Newfoundland Power charges all cost of removal to accumulated depreciation (in accordance with Newfoundland Power's financial disclosure under Canadian and USGAAP) whereas NL Hydro's policy is to capitalize cost of removal to the new assets in replacement projects (in accordance with the IFRS requirements) and NL Hydro has indicated that they will continue with this

practice. This reflects NL Hydro's view that the replacement of an asset is dependent upon the removal of the existing asset and thus should be capitalized to the new replacement asset. However, if there are no replacement assets (i.e. meaning replacement in the exact same location), then Concentric Advisors recommends that cost of removal will be charged to accumulated depreciation. The effect of this policy is a reduced cost of removal expectation as NL Hydro is capitalizing a portion of the removal costs. NL Hydro does not have account specific cost of removal results however corporate removal costs are available and have been provided for the past four years. To reflect this recent corporate cost of removal experience, Concentric Advisors has applied a reduced percentage to all cost of removal accounts accordingly.

The depreciation rates should be reviewed periodically to reflect the changes that result from plant and reserve account activity. A depreciation reserve deficiency or surplus will develop if future capital expenditures vary significantly from those anticipated in this study.

# PART II. DEVELOPMENT OF DEPRECIATION PARAMETERS

# PART II. DEVELOPMENT OF DEPRECIATION PARAMETERS

## DEPRECIATION

Depreciation, in public utility regulation, is the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of utility plant in the course of service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among causes to be given consideration are wear and tear, deterioration, action of the elements, inadequacy, and obsolescence, changes in the art, changes in demand, and the requirements of public authorities.

Depreciation, as used in accounting, is a method of distributing fixed capital costs, less net salvage, over a period of time by allocating annual amounts to expense. Each annual amount of such depreciation expense is part of that year's total cost of providing electric utility service. Normally, the period of time over which the fixed capital cost is allocated to the cost of service is equal to the period of time over which an item renders service, that is, the item's service life. The most prevalent method of allocation is to distribute an equal amount of cost to each year of service life. This method is known as the straight-line method of depreciation.

The calculation of annual and accrued depreciation based on the straight line method requires the estimation of survivor curves and is described in the following sections of this report. The development of the proposed depreciation rates also requires the selection of group depreciation procedures, as discussed in Part III of this report.

## ESTIMATION OF SURVIVOR CURVES

### Survivor Curves

The use of an average service life for a property group implies that the various units in the group have different lives. Thus, the average life may be obtained by determining the separate lives of each of the units, or by constructing a survivor curve by plotting the number of units which survive at successive ages using the retirement rate method of analysis.

The range of survivor characteristics usually experienced by utility and industrial properties is encompassed by a system of generalized survivor curves known as the Iowa type curves. There are four families in the Iowa system, labeled in accordance with the location of the modes of the retirements in relationship to the average life and relative height of the modes. The left-moded curves are those in which the greatest frequency of retirement occurs to the left of, or prior to, average service life. The symmetrical-moded curves are those in which the greatest frequency of retirement occurs at average service life. The right-moded curves are those in which the greatest frequency occurs to the right of, or after, the average service life. The origin-moded curves are those in which the greatest frequency of retirement occurs at the origin, or immediately after age 0. The letter designation of each family of curves (L, S, R or O) represents the mode of the associated frequency curve with respect to the average service life. The numerical subscripts represent the relative heights of the modes of the frequency curves within each family.

A discussion of the general concept of survivor curves and retirement rate method is presented in Appendix 2 of this report.

## Survivor Curve and Net Salvage Judgments

The survivor curve estimates were based on judgment which considered a number of factors. The primary factors were the statistical analysis of data; current policies and outlook as determined during conversations with management personnel, knowledge and review of upcoming capital projects, which included reviews of detailed upcoming project business cases and operational staff interviews. The average service life analysis also included a review of the impact of large retirements caused by forces of nature, and on the knowledge Concentric Advisors developed through the completion of numerous electric utility studies. Additionally, detailed asset retirement information (where known) for upcoming retirement projects was incorporated into the data files for the analysis of average service life in order to ensure that all known impacts of retirements could be considered.

NL Hydro has indicated that there is minimal historical net salvage data. As such, the initial estimates of net salvage were based on peer comparison and on the knowledge and experience of Concentric Advisors.

**NL Hydro Accounts**

Account B02 – Boiler System - The investment in Boiler System comprises 2.2% of the total depreciable plant. The investment in this account mainly consists of steam generator, boiler structure & boiler secondary super-heater. The currently approved average service life estimate is the Iowa 35-R3. The retirement rate analysis prepared in this study reviewed the plant installed over the period of 1968 through 2015 and the retirement experience covering the period of 1968 through 2015. Over this period this account has experienced $11,281,692 of retirements over a widely sparse range of ages as summarized on the observed life table provided on pages V-12 and V-13 of this report. An analysis of the currently approved Iowa 35-R3 did not provide a good fit over the observed data. To better fit the data a five-year increase to the average service life was deemed appropriate. As shown on the fitted smooth curve on page V-11, an Iowa 40-R3 provides a better fit to the observed data. Discussions and review with NL Hydro representatives suggested that the recommended 40-R3 was reasonable for this account. Therefore, the current approved Iowa 40-R3 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has used its knowledge and experience, peer comparisons, knowledge of NL Hydro's capitalization and removal policies, and discussions with NL Hydro representatives to recommend negative 8 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 8 percent is a reasonable for this account. Based on the above, Concentric Advisors recommends negative 8 percent to best represent the future expectations for the equipment in this account.

Account B05 – Buildings - Other - The investment in Buildings - Other comprises 2.7% of the total depreciable plant. The investment in this account mainly consists of building structures and components including HVAC systems, security, etc. The currently approved average service life estimate is the Iowa 50-R0.5. The retirement rate analysis prepared in this study reviewed the plant over the period of 1965 through 2015. Over this period this account has experienced $11,256,905 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-21 and V-22 of this report. As shown on the fitted smooth curve on page V-20, the currently approved Iowa 50-R0.5 provides a reasonable fit to the complete observed data. A peer

comparison of Canadian utilities produced a wide range from 20 to 70 years. Discussions and review with NL Hydro representatives suggested that the currently approved Iowa 50-R0.5 is a reasonable expectation for this account. Based on the above, the current approved Iowa 50-R0.5 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation of negative 30 percent for their Hydro Production Structures, negative 35 percent for their Diesel Structures, 0 percent for their Substation Structures, negative 5 percent for their Distribution Structures, and 5 percent and 15 percent for their small and large General Plant Structures respectively. Nova Scotia Power Inc. utilizes negative 5 percentage for their Distribution Structures and for their General Plant Structures. Newfoundland Power Inc. has a net salvage percentage of negative 10 percent for their Hydro Production Structures, negative 20% for their Diesel Structures, negative 15 percent for their Transmission Substation Structures, and negative 10 percent and 0 percent for their small and large buildings respectively. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 3 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 3 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 3 percent to best represent the future expectations for the equipment in this account.

Account B06 – Buildings - Metal - The investment in Buildings - Metal comprises 1.3% of the total depreciable plant. The investment in this account mainly consists of powerhouse and pump-house structures and components, and metal control buildings in stations. The currently approved average service life estimate is the Iowa 55-R3. The retirement rate analysis prepared in this study reviewed the plant over the period of 1965 through 2015. Over this period this account has experienced $1,895,706 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-24 and V-25 of this report. As shown on the fitted smooth curve on page V-23, the currently approved Iowa 55-R3 still provides a reasonable fit to the complete observed data. A peer comparison of Canadian utilities produced a wide range from 20

to 70 years. Discussions and review with NL Hydro representatives suggested that the currently approved Iowa 55-R3 is a reasonable expectation for this account. Based on the above, the currently approved Iowa 55-R3 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation of 5 percent and 15 percent for their small and large buildings respectively. Nova Scotia Power Inc. utilizes negative 5 percentage. Newfoundland Power Inc. has a net salvage percentage of negative 10 percent and 0 percent for their small and large buildings respectively. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 3 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 3 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 3 percent to best represent the future expectations for the equipment in this account.

Account C09 – Circuit Breakers - The investment in Circuit Breakers comprises 1.5% of the total depreciable plant. The investment in this account mainly consists of breakers & upgrades, switches and switchgear. The currently approved average service life estimate is the Iowa 55-R3. The retirement rate analysis prepared in this study reviewed the plant over the period of 1965 through 2015. Over this period this account has experienced $2,751,415 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-49 and V-50 of this report. A significant amount of retirements have occurred relatively early at ages 0.0 to 9.5. Concentric Advisors has placed less emphasis on this early retirement activity. An analysis of the currently approved Iowa 55-R3 did not provide a good fit over the observed data. As shown on the fitted smooth curve on page V-48, an Iowa 60-R2.5 provides an excellent fit to the observed data. Discussions and review with NL Hydro representatives agreed that the recommended Iowa 60-R2.5 is a reasonable expectation for this account. Based on the above, the current approved Iowa 60-R2.5 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has used its knowledge and experience, peer comparisons, knowledge of NL Hydro's capitalization and removal policies, and discussions with NL

Hydro representatives to recommend negative 8 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 8 percent is a reasonable for this account. Based on the above, Concentric Advisors recommends negative 8 percent to best represent the future expectations for the equipment in this account.

Account C13 – Conductor - Transmission - The investment in Conductor - Transmission account comprises 2.6% of the total depreciable plant. The investment in this account mainly consists of transmission conductor. The currently approved average service life estimate is the Iowa 60-R3. The retirement rate analysis prepared in this study reviewed the plant over the period of 1967 through 2015. Over this period this account has experienced $3,158,000 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-58 and V-59 of this report. As shown on the fitted smooth curve on page V-57, the currently approved Iowa 60-R3 provides a good fit over the available observed data. A peer comparison of Canadian utilities produced a range from 45 to 80 years. Discussions and review with NL Hydro representatives indicated that there are no major issues with conductor. They also indicated that existing conductor is mainly bare but there is some coated conductor and that there are no salt water issues. NL Hydro representatives suggested that the current 60-R3 was reasonable for this account. Based on the above, the current approved Iowa 60-R3 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation of negative 25 percent. Nova Scotia Power Inc. utilizes negative 10 percentage for their Transmission Conductor. Newfoundland Power Inc. utilizes negative 35 percentage for their Transmission Conductor. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 20 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 20 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 20 percent to best represent the future expectations for the equipment in this account.

Account C14 – Conductor - Distribution - The investment in Conductor - Distribution comprises 1.3% of the total depreciable plant. The investment in this account mainly consists of distribution conductors at 25 kV and below including primary, secondary and service drop conductors. The currently approved average service life estimate is the Iowa 55-R3. The retirement rate analysis prepared in this study reviewed the plant over the period of 1971 through 2015. Over this period this account has experienced $2,500,908 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-61 and V-62 of this report. An analysis of the currently approved Iowa 55-R3 did not provide a good fit to the observed data. As shown on the fitted smooth curve on page V-60, an Iowa 45-R3 provides an excellent fit over the available observed data. A peer comparison of Canadian utilities produced a wide range from 29 to 60 years. Discussions and review with NL Hydro representatives indicated that there are no major issues with conductor, the smaller communities are converting to electrical power sources so there is a need to upgrade conductor size. They also indicated that existing conductor is mainly bare but there is some coated conductor and that there are no salt water issues. NL Hydro representatives agreed that the recommended 45-R3 was reasonable for this account. Based on the above, the currently approved Iowa 45-R3 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation of negative 25 percent. Nova Scotia Power Inc. utilizes negative 15 percentage for their Distribution Conductor. Newfoundland Power Inc. utilizes a range of negative 25 percent to negative 35 percent for their Distribution Conductor. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 14 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 14 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 14 percent to best represent the future expectations for the equipment in this account.

Account C15 – Control, Meter, Relaying - The investment in Control, Meter, Relaying account comprises 1.1% of the total depreciable plant. The investment in this

account mainly consists of plant and turbine protection, control meter/relay including revenue metering, station controls and protection. The currently approved average service life estimate is the Iowa 30-R1. The retirement rate analysis prepared in this study reviewed the plant over the period of 1966 through 2015. Over this period this account has experienced $2,594,863 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-64 and V-65 of this report. An analysis of the currently approved Iowa 30-R1 did not provide a good fit to the observed data. As shown on the fitted smooth curve on page V-63, a recommended Iowa 40-R2.5 provides a good fit to the observed data. Discussions and review with NL Hydro representatives suggested that the recommended Iowa 40-R2.5 is a reasonable expectation for this account. Based on the above, the currently approved Iowa 40-R2.5 is recommended to best represent the future expectations for the equipment in this account.

NL Hydro representatives have indicated that 0 percent is a reasonable net salvage expectation for this account. Based on these comments, Concentric Advisors recommends 0 percent to best represent the future expectations for the equipment in this account.

Account D01 – Dams, Dykes, Canals and Tunnels – The investment in Dams, Dykes, Canals and Tunnels is the largest account and comprises approximately 13.8% of the total depreciable plant. The investment in this account mainly consists of dams, dykes, canals, and tunnels. The currently approved average service life estimate is an Iowa 100-R4. The retirement experience has been very small and as such has not resulted in any reliable historical indications. As such, the average service life recommendations were based primarily on the comments received from the NL Hydro operational staff, and on the experience of Concentric Advisors. A peer comparison of Canadian utilities was conducted which indicated a range from 70 years to 125 years. Discussions and review with NL Hydro representatives indicated that an active condition assessment program along with routine surveillance is utilized. No large capital programs are forecasted other than for routine maintenance. There was also general agreement that a 110-year life was reasonable for this account. Based on these comments and on

the peer comparison of Canadian utilities, an Iowa 110-R4 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation of negative 30 percent with Nova Scotia Power Inc. utilizing a range for all Hydro accounts of negative 20 percentage to negative 445 percent with an investment weighted average of negative 69 percent. Newfoundland Power Inc. has a net salvage percentage of negative 25 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 8 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 8 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 8 percent to best represent the future expectations for the equipment in this account.

Account D02 – Diesel Systems and Engines - The investment in Diesel Systems and Engines comprises 1.6% of the total depreciable plant. The investment in this account mainly consists of engines, generators, cooling systems, and switchgear. The currently approved average service life estimate is the Iowa 25-S0.5. The retirement rate analysis prepared in this study reviewed the plant over the period of 1965 through 2015. Over this period this account has experienced $20,478,011 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-79 and V-80 of this report. An analysis of the currently approved Iowa 25-S0.5 did not provide a good fit over the observed data. As shown on the fitted smooth curve on page V-78, an Iowa 25-L0.5 provides an excellent fit over the observed data. Discussions and review with NL Hydro representatives indicated that the historical indications and recommended 25-L0.5 was reasonable for this account. Therefore, an Iowa 25-L0.5 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from two electric utilities. Northwest Territories Power Corporation has a recommendation of negative 25 percent and negative 5 percent for their Diesel Primer Movers and Generators respectively. Newfoundland Power Inc. has a net salvage percentage range of negative 20 percent to negative 65 percent for their Primer Movers and Generators. In

consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 11 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 11 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 11 percent to best represent the future expectations for the equipment in this account.

Account F06 – Fuel Systems - The investment in Fuel Systems comprises 1.6% of the total depreciable plant. The investment in this account mainly consists of fuel systems including storage tanks. The currently approved average service life estimate is the Iowa 50-R1.5. The retirement rate analysis prepared in this study reviewed the plant over the period of 1956 through 2015. Over this period this account has experienced $4,654,704 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-109 and V-110 of this report. As shown on the fitted smooth curve on page V-108, an Iowa 50-R1.5 still provides a good fit over the observed data. Discussions and review with NL Hydro representatives indicated that the historical indications and recommended 50-R1.5 was reasonable for this account. Therefore, an Iowa 50-R1.5 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from two electric utilities. Northwest Territories Power Corporation has a recommendation of negative 75 percent. Newfoundland Power Inc. has a net salvage range of negative 20 percent to negative 65 percentage. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 11 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 11 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 11 percent to best represent the future expectations for the equipment in this account.

Account G01 – Gas Turbine Systems - The investment in Gas Turbine Systems comprises 2.6% of the total depreciable plant. The investment in this account mainly consists of turbine engine and generators. The currently approved average service life estimate is the Iowa 35-R4. The retirement rate analysis prepared in this study reviewed the plant over the period of 1968 through 2015. Over this period this account has

experienced $5,403,986 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-112 and V-113 of this report. An analysis of the currently approved Iowa 35-R4 did not provide a good fit over the observed data. As shown on the fitted smooth curve on page V-111, an Iowa 45-R3 provides a good fit over the observed data. A peer comparison of Canadian utilities produced a range from 30 to 55 years. Discussions and review with NL Hydro representatives indicated that there are four Gas Turbines in NL Hydro's system. These turbines are mainly used for stand by and peaking purposes and that there has been little historical use and that this will likely continue in the near future. Discussions and review with NL Hydro representatives suggested that the current 35-year average service life appeared short and that the recommended 45-R3 was reasonable for this account. Therefore, the current approved Iowa 45-R3 is recommended to best represent the future expectations for the equipment in this account.

Newfoundland Power Inc. has a net salvage of negative 3 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 2 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 2 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 2 percent to best represent the future expectations for the equipment in this account.

Account G03 – Generators - The investment in Generators comprises 4.0% of the total depreciable plant. The investment in this account mainly consists of the electric power generator and assembly including rotor, bearings and excitation systems. The currently approved average service life estimate is the Iowa 60-S4. The retirement rate analysis prepared in this study reviewed plant over the period of 1966 through 2015. Over this period this account has experienced $2,804,759 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-118 and V-119 of this report. The currently approved Iowa 60-S4 did not fit the observed data as well as the Iowa 65-S3. A peer comparison of Canadian utilities indicated a range from 50 years to 70 years. Discussions and review with NL Hydro representatives suggested that the current 60-S4 appeared a little short and that an increase to a 65 year average service life was more reasonable for the equipment in this account. Based on

the above and the peer comparison of Canadian utilities, an Iowa 65-S3 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation of negative 15 percent with Nova Scotia Power Inc. utilizing a range for all Hydro accounts of negative 20 percentage to negative 445 with an investment average of negative 69 percent. Newfoundland Power Inc. has a net salvage percentage of negative 25 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 8 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 8 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 8 percent to best represent the future expectations for the equipment in this account.

Account I03 – Insulators - The investment in Insulators comprises 1.6% of the total depreciable plant. The investment in this account mainly consists of insulators for transmission lines and stations. The currently approved average service life estimate is the Iowa 30-L3. The retirement rate analysis prepared in this study reviewed the plant over the period of 1966 through 2015. Over this period this account has experienced $6,332,763 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-136 and V-137 of this report. An analysis of the currently approved Iowa 30-L3 did not provide a good fit over the observed data. As shown on the fitted smooth curve on page V-135, an Iowa 35-L3 provides an excellent fit over the observed data. A peer comparison of Canadian utilities produced a range from 31 to 37 years. Discussions and review with NL Hydro representatives indicated that porcelain and glass insulators are used in NL Hydro's system. They also viewed that the historical indications of a recommended 35-L3 was reasonable for this account. Therefore, an Iowa 35-L3 is recommended to best represent the future expectations for the equipment in this account.

NL Hydro representatives have indicated an expectation of 0 percent as a reasonable net salvage expectation for this account. Based on these comments, Concentric Advisors recommends 0 percent to best represent the future expectations for the equipment in this account.

Account M10 – Miscellaneous Units of Property - The investment in Miscellaneous Units of Property comprises 1.0% of the total depreciable plant. The investment in this account mainly consists of studies and assessments. The currently approved average service life estimate is the Iowa 20-R1. The retirement rate analysis prepared in this study reviewed the plant over the period of 1966 through 2015. Over this period this account has experienced $3,507,943 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-176 and V-177 of this report. As shown on the fitted smooth curve on page V-175, a recommended Iowa 22-R1.5 provides a good fit to the observed data. Discussions and review with NL Hydro representatives suggested that the recommended Iowa 22-R1.5 is a reasonable expectation for this account. Based on the above, the current approved Iowa 22-R1.5 is recommended to best represent the future expectations for the equipment in this account.

NL Hydro representatives have indicated that 0 percent is a reasonable net salvage expectation for this account. Based on these comments, Concentric Advisors recommends 0 percent to best represent the future expectations for the equipment in this account.

Account P03 – Penstock - The investment in Penstock comprises 2.2% of the total depreciable plant. The investment in this account mainly consists of penstock. The currently approved average service life estimate is an Iowa 70-R4. The retirement experience has been very small and as such has not resulted in reliable historical indications. A peer comparison of Canadian utilities indicated a 60-year average service life. Discussions and review with NL Hydro representatives suggested that the current 70-R4 was reasonable for this account. Therefore, the currently approved Iowa 70-R4 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from two electric utilities. Nova Scotia Power Inc. utilizes a range for all Hydro accounts of negative 20 percentage to negative 445 with an investment average of negative 69 percent. Newfoundland Power Inc. has a net salvage percentage of negative 25 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 8 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 8 percent is reasonable for this

account. Based on the above, Concentric Advisors recommends negative 8 percent to best represent the future expectations for the equipment in this account.

Account P04 – Pole Cribs and Pole Hardware - The investment in Pole Cribs and Pole Hardware comprises 4.5% of the total depreciable plant. The investment in this account mainly consists of pole cribs and pole hardware at the distribution level including cross arms, insulators, brackets, pole gains, and cut-outs/fuse assemblies. The currently approved average service life estimate is the Iowa 50-L2. The retirement rate analysis prepared in this study reviewed plant over the years 1966 through 2015. Over this period this account has experienced $9,700,360 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-196 and V-197 of this report. The currently approved Iowa 50-L2 provided a good fit up to age 15, but does not fit to the ages afterwards. The Iowa 35-S2.5 provides a more appropriate fit to the complete observed data. A peer comparison of Canadian utilities produced a range from 31 to 85 years. Discussions and review with NL Hydro representatives suggested that the historical experience and the recommended Iowa 35-S2.5 is a reasonable expectation for this account. Based on the above and the peer comparison of Canadian utilities, the Iowa 35-S2.5 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized the net salvage recommendation of Account P05 of negative 20 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 20 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 20 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 20 percent to best represent the future expectations for the equipment in this account.

Account P05 – Pole Structures - Wood - The investment in Pole Structures – Wood comprises 4.9% of the total depreciable plant. The investment in this account mainly consists of wood pole structures including inspection and refurbishment at the transmission level (46 kV and above). The currently approved average service life estimate is an Iowa 53-R4. The retirement rate analysis prepared in this study reviewed the plant installed over the period of 1960 through 2015 and the retirement experience

covering the period of 1965 through 2015. Over this period this account has experienced $11,310,961 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-199 to V-200 of this report. The currently approved Iowa 53-R4 did not provide a good fit to the observed data. As shown on the fitted smooth curve on page V-198, the Iowa 57-R3 provides an excellent fit to the observed data. A peer comparison of Canadian utilities produced a range from 40 to 65 years. NL Hydro representatives suggested that the historical experience and resultant Iowa 57-R3 are reasonable expectations for this account. Based on the above, the Iowa 57-R3 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation of negative 25 percent. Nova Scotia Power Inc. utilizes negative 35 percentage. Newfoundland Power Inc. has a net salvage percentage of negative 35 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 20 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 20 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 20 percent to best represent the future expectations for the equipment in this account.

Account P07 – Poles - Wood - The investment in Poles - Wood comprises 2.8% of the total depreciable plant. The investment in this account mainly consists of wood poles generally at the distribution level 25 kV and below**.** The currently approved average service life estimate is the Iowa 37-R3. The retirement rate analysis prepared in this study reviewed the plant over the period of 1967 through 2015. Over this period this account has experienced $11,072,192 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-204 and V-205 of this report. The currently approved Iowa 37-R3 provided a poor fit on the observed data. A peer comparison of Canadian utilities produced a range from 38 to 65 years. NL Hydro representatives indicated that the historical life for this account appeared too short. They indicated that the purchase previously owned facilities and subsequent retirements (with an original vintage equal to the acquisition date) has resulted in a short average service

life. Based on this, it was agreed that a peer comparison of Canadian utilities, Iowa 43-R1 would be a more appropriate estimate. As such, the Iowa 43-R1 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation for their station equipment of negative 25 percent with Nova Scotia Power Inc. utilizing a negative 40 percent. Newfoundland Power Inc. has a net salvage percentage of negative 35 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 20 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 20 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 20 percent to best represent the future expectations for the equipment in this account.

Account P10 – Powerhouse - The investment in Powerhouse comprises 3.9% of the total depreciable plant. The investment in this account mainly consists of powerhouse structures**.** The currently approved average service life estimate is an Iowa 75-R3. The retirement experience has been very small and as such has not resulted in any reliable historical indications. A peer comparison produced a life of 75 years. Discussions and review with NL Hydro representatives suggested that the current 75-R3 was reasonable for the equipment in this account. Based on the above and the peer comparison, an Iowa 75-R3 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation of negative 30 percent with Nova Scotia Power Inc. utilizing a range for all Hydro accounts of negative 20 percentage to negative 445 with an investment average for all their Hydro accounts of negative 69 percent. Newfoundland Power Inc. has a net salvage percentage of negative 10 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 8 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 8 percent is reasonable for this account. Based on the above, Concentric Advisors recommends

negative 8 percent to best represent the future expectations for the equipment in this account.

Account R13 – Roads - The investment in Roads comprises 3.2% of the total depreciable plant. The investment in this account mainly consists of gravel and access roads. The currently approved average service life estimate is the Iowa 50-R4. The retirement experience has been very small and as such has not resulted in any reliable historical indications. A peer comparison of Canadian utilities produced a range from 40 years to 65 years. Discussions and review with NL Hydro representatives suggested that the current 50-year average service life appeared a little short and that an increase to a 60 year average service life was more reasonable for the equipment in this account. Based on the above and the peer comparison of Canadian utilities, an Iowa 60-R4 is recommended to best represent the future expectation for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation for their station equipment of negative 5 percent with Nova Scotia Power Inc. utilizing a range for all Hydro accounts of negative 20 percentage to negative 445 with an investment average of negative 69 percent. Newfoundland Power Inc. has a net salvage percentage of negative 15 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 8 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 8 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 8 percent to best represent the future expectations for the equipment in this account.

Account T04 – Towers - The investment in Towers comprises 3.0% of the total depreciable plant. The investment in this account mainly consists of steel towers including inspection and refurbishment. The currently approved average service life estimate is the Iowa 65-R3. The retirement rate analysis prepared in this study reviewed plant over the period of 1967 through 2015. Over this period this account has experienced $1,861,164 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-301 and V-302 of this report. Although the historical data is limited, it did indicate that a slightly higher Iowa curve of R4 did provide

a better fit to the historical data than the currently approved R3 curve. A peer comparison of Canadian utilities produced a range from 55 years to 85 years. Discussions and review with NL Hydro representatives suggested that the recommended 65-R4 was reasonable for this account. Based on the above, an Iowa 65-R4 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation for their station equipment of negative 25 percent with Nova Scotia Power Inc. utilizing a negative 35 percent. Newfoundland Power Inc. has a net salvage percentage of negative 35 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 20 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 20 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 20 percent to best represent the future expectations for the equipment in this account.

Account T05 – Transformers - Other - The investment in Transformers - Other comprises 3.4% of the total depreciable plant. The investment in this account mainly consists of transformers including power transformers, autotransformers and generator step-up transformers. The currently approved average service life estimate is the Iowa 55-R3. The retirement rate analysis prepared in this study reviewed plant over the period of 1964 through 2015. Over this period this account has experienced $6,447,435 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-304 and V-305 of this report. As shown on the fitted smooth curve on page V-303, the currently approved Iowa 55-R3 provides a good fit over the observed data. A peer comparison of Canadian utilities produced a range from 40 to 50 years. Discussions and review with NL Hydro representatives suggested that the historical experience and currently approved Iowa 55-R3 are reasonable expectations for this account. Based on the above, the current approved Iowa 55-R3 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation for their station equipment of negative 20 percent with Nova Scotia Power Inc. utilizing a negative 69

percent. Newfoundland Power Inc. has a net salvage percentage of negative 15 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 6 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 6 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 6 percent to best represent the future expectations for the equipment in this account.

Account T07 – Transformers – Pole Mounted - The investment in Distribution Transformers – Pole Mounted comprises 1.4% of the total depreciable plant. The investment in this account mainly consists of pole mounted distribution transformers**.** The currently approved average service life estimate is the Iowa 30-R2. The retirement rate analysis prepared in this study reviewed plant over the period of 1965 through 2015. Over this period this account has experienced $7,011,936 of retirements over a widely dispersed range of ages as summarized on the observed life table provided on pages V-310 and V-311 of this report. An analysis of the currently approved Iowa 30-R2 did not provide a good fit to the observed data. As shown on the fitted smooth curve on page V-309, an Iowa 30-L1 provides an excellent fit over the observed data. A peer comparison of Canadian utilities produced a range from 33 to 40 years. Discussions and review with NL Hydro representatives suggested that the historical experience of an Iowa 30-L1 is a reasonable expectation for this account. Based on the above, the currently approved Iowa 30-L1 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation of negative 20 percent. Nova Scotia Power Inc. utilizes negative 5 percentage for their Substation Equipment. Newfoundland Power Inc. utilizes negative 15 percentage for their Substation Equipment. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 8 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 8 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 8 percent to best represent the future expectations for the equipment in this account.

Account T09 – Turbines - The investment in Turbines comprises 3.5% of the total depreciable plant. The investment in this account mainly consists of turbines. The currently approved average service life estimate is the Iowa 50-R3. The retirement experience has been very small and as such has not resulted in any reliable historical indications. A peer comparison of Canadian utilities produced a range of 30 to 55 years. Discussions and review with NL Hydro representatives indicated that there are four gas turbines utilized for mainly stand-by and peaking purposes and have little historical usage. Discussions and review with NL Hydro representatives also suggested that the current 50-year average service life appeared a little short and that an increase to a 55-year average service life was more reasonable for the equipment in this account. Based on the above and the peer comparison of Canadian utilities, an Iowa 55-R2.5 is recommended to best represent the future expectations for the equipment in this account.

Concentric Advisors has utilized net salvage recommendations from three electric utilities. Northwest Territories Power Corporation has a recommendation of negative 15 percent with Nova Scotia Power Inc. utilizing a range for all Hydro accounts of negative 20 percentage to negative 445 with an investment average for all their Hydro accounts of negative 69 percent. Newfoundland Power Inc. has a net salvage percentage of negative 25 percent. In consideration of the above and knowledge of NL Hydro's capitalization and removal policies, Concentric Advisors views negative 14 percent as a net salvage expectation. NL Hydro representatives have indicated that negative 14 percent is reasonable for this account. Based on the above, Concentric Advisors recommends negative 14 percent to best represent the future expectations for the equipment in this account.

# PART III. CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

# PART III. CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

## CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

### Review of Conversion to a Group Accounting Method

In the Public Utilities Board Order No P.U. 40(2012), the Board directed as follows:

> *"In accordance with the terms of the Settlement Agreement Hydro has agreed to provide, at the time of its next depreciation study, a report, on a limited number of groups of property, comparing the agreed methodology to the application of depreciation on a pure group basis. The Board notes that the findings of this report would not be applied retroactively but rather would provide information for future rate making purposes. In the Board's view this is a reasonable approach to resolve what appears to have been a difference in expert opinion on this specific issue. The Board will accept this recommendation."*[6]

Attached as Appendix 1 to this report is the "Evidence of Larry E. Kennedy Related to the Conversion to Group Accounting Methods" (Additional Evidence of Larry Kennedy"). This Evidence provides the detailed response to the above PUB directive resulting from the last depreciation study and negotiated settlement application relating to the historical NL Hydro departure from the use of typical regulated group depreciation accounting.

Group depreciation refers to the widely accepted procedure for rate regulated utilities where, rather than depreciating each item by itself (unit depreciation), a group containing homogenous units of plant which are alike in character, used in the same manner throughout the utilities service territory, and operated under the same general conditions is formed. Group depreciation recognizes that there will be differing lives for individual units within the group. For example, poles are often combined into a single group. Some poles will be retired due to storms or third party damage (for example automobile accidents, for strikes by farm equipment, etc.). Others will decay, while some will be displaced due to road relocations, and some will be replaced due to the need to provide underground service. However they are combined into the same group because they are homogenous units. With group depreciation, the entire group is considered as

[6] Order No. P.U. 40(2012), page 3, lines 28-35.

the asset being depreciated, therefore, one depreciation rate is applied to the entire group and only one accumulated depreciation account is tracked for the entire group.

Under group depreciation no gain or loss is recognized for retirement of individual assets, as only one depreciation calculation is made on the entire group. Upon retirement of an asset from the group, the total original cost of the asset is debited to the accumulated depreciation account and credited to the asset account. Gross salvage received (if applicable) for the retired asset is credited to the accumulated depreciation account and cost of removal is debited to the accumulated depreciation account. Under group depreciation, since the accumulated depreciation relates to the entire group rather than to specific assets within the group, no gain or loss is recognized. This assumes that the group depreciation rate is accurate for the group as a whole and that the cost of the retired asset, net of gross salvage and cost of removal, is being fully provided for in the accumulated depreciation account.

A full description of the review is provided in the Additional Evidence of Larry Kennedy. Based on the review it is noted that long life accounts such as Wood Poles and Conductor are virtually neutral as to the use of the current hybrid approach versus traditional grouping accounting approaches. The Additional Evidence of Larry Kennedy recommends that:

- NL Hydro convert to a more traditional Group Accounting and Depreciation Practice for all accounts other than Amortized accounts as discussed below;

- That Amortized accounts (as noted with a Square or SQ Iowa curve) be subjected to a pure amortization procedure wherein the investment in these accounts is retired when it reaches its full amortization period. All retirements in these accounts should be made only at the expiration of the amortization period.

## Group Depreciation Procedures

Based on the recommended conversion to Group Accounting, the selection of a group depreciation procedure is required. When more than a single item of property is under consideration, a group procedure for depreciation is appropriate because normally

all of the items within a group do not have identical service lives, but have lives that are dispersed over a range of time. There are two primary group procedures, namely, Average Service Life (ASL) and Equal Life Group (ELG).

In the average service life procedure, the rate of annual depreciation is based on the average service life of the group, and this rate is applied to the surviving balances of the group's cost. A characteristic of this procedure is that the cost of plant retired prior to average life is not fully recouped at the time of retirement, whereas the cost of plant retired subsequent to the average life is more than fully recouped. Over the entire life cycle, the portion of cost not recouped prior to average life is balanced by the cost recouped subsequent to average life.

In the ELG procedure, the property group is subdivided according to service life. That is, each equal life group includes that portion of the property which experiences the life of that specific group. The relative size of each equal life group is determined from the property's life dispersion curve. The calculated depreciation for the property group is the summation of the calculated depreciation based on the service life of each equal life group.

In the determination of the depreciation rates in this study, the use of the average service life procedure has been continued for all vintages up to and including 2014. For current plant (i.e. 2015 vintages), the use of the equal life group procedure will be utilized providing an enhanced matching of depreciation expense to the consumption of service value.

## Impact of the International Financial Reporting Standards (IFRS) in this Study

In the determination of the depreciation rates for Regulatory purposes Concentric Advisors has applied its depreciation parameters on an original cost basis. However, upon implementation of IFRS NL Hydro's reported asset values are calculated on a deemed cost basis in the disclosure of the plant in service in its accounting systems for financial disclosure purposes. Therefore the depreciation rates need to recognize that the cost basis is a deemed cost rather than an original cost. To ensure proper and accurate recovery, Concentric Advisors has applied its developed depreciation expense (as determined from an original cost base) to NL Hydro's deemed costs to develop

deemed cost accrual rates for each depreciable account as shown on Table 1. Concentric Advisors notes that the deemed cost depreciation rates are for financial disclosure purposes only. These deemed cost accrual rates will then ensure the accurate recovery of NL Hydro's deemed cost investment as of December 31, 2015.

The above deemed cost accrual rates reflect the position of each account's booked depreciation reserve as of December 31, 2015. If an account's booked depreciation reserve is in a deficiency or surplus position, the resultant accrual rate reflects an adjustment to correct this deficiency or surplus over the applicable account's composite remaining life. However, for future additions (i.e. post 2015), the application of the developed deemed cost accrual rates will incorrectly adjust the post 2015 addition's depreciation expense due to the above 2015 book depreciation reserve adjustment for each applicable account. As such, Concentric Advisors recommends, and has provided whole life accrual rates that do not reflect the booked depreciation deficiency or surplus position as of December 31, 2015. This will more accurately reflect the correct depreciation expense on post 2015 additions.

The Concentric Advisors recommendation of including an accrual provision for the recovery of future costs of removal in the depreciation expense, and to implement traditional group accounting practices are in accordance with the IFRS 14. However, in order to rely upon IFRS 14, the cost of removal component being recovered through depreciation expense needs to be specifically identified and tracked in accordance with IFRS 14. Therefore, this study separately provides for the depreciation rates associated with the recovery of future cost of removal in Table 1B provided in the Results section of this report. Additionally, the impacts of the conversion to traditional group accounting will also require the tracking of gains or losses on retirements through the reporting as directed under IFRS 14[7]. While Concentric Advisors notes that the use of the ELG procedure and accruing for cost of removal will ultimately eliminate the need to calculate gains and losses on most retirement transactions, it will take a number of years of use of

[7] Including gains and losses associated with original costs of retirements, costs of removal and gross salvage proceeds

the ELG procedure and cost of removal accrual before the tracking of gains and losses through IFRS 14 can be eliminated.

## CALCULATION OF ANNUAL AND ACCRUED AMORTIZATION

Amortization is the gradual extinguishment of an amount in an account by distributing such amount over a fixed period, over the life of the asset or liability to which it applies, or over the period during which it is anticipated the benefit will be realized. Normally, the distribution of the amount is in equal amounts to each year of the amortization period through the use of a square Iowa curve, which assumes no retirement over the life of the investment through to its final retirement at the end of the amortization period.

The calculation of annual and accrued amortization requires the selection of an amortization period. The amortization periods used in this report were based on judgment which incorporated a consideration of the period during which the assets will render most of their service, the amortization period and service lives used by other utilities, and the service life estimates previously used for the asset under depreciation accounting.

For the purpose of calculating annual amortization amounts as of December 31, 2015, the book depreciation reserve for each plant account or subaccount is assigned or allocated to vintages. The book reserve assigned to vintages with an age greater than the amortization period is equal to the vintage's original cost. The remaining book reserve is allocated among vintages with an age less than the amortization period in proportion to the calculated accrued amortization. The calculated accrued amortization is equal to the original cost multiplied by the ratio of the vintage's age to its amortization period. The annual amortization amount is determined by dividing the future amortizations (original cost less allocated book reserve) by the remaining period of amortization for the vintage.

Amortization accounting is proposed for a number of accounts that represent a small portion of depreciable December 31, 2015 plant in service. The accounts and their amortization periods are as follows:

| ACCOUNT | TITLE | AMORTIZATION PERIOD, YEARS |
|---|---|---|
| C11 | Computers | 5 |
| O01 | Office Equipment | 20 |
| O02 | Office Furniture | 20 |
| P11 | Printers | 6 |
| R14 | Routers and LAN | 5 |
| S03 | Servers | 7 |
| S05 | Software | 7 |
| T02 | Test Equipment | 20 |
| T03 | Tools and Equipment | 20 |
| T10 | Holyrood Turbines – Combuster Overhaul | 3 |
| T11 | Holyrood Turbines – Turbine Overhaul | 6 |
| T12 | Holyrood Turbine – Compressor Overhaul | 12 |

For the above accounts where amortization accounting is proposed, Concentric Advisors recommends that for each vintage, for each applicable account, the complete amortization period be utilized irrespective of whether the related fixed asset equipment is removed from active service. Likewise, Concentric Advisors further recommends that when each vintage for each applicable account reaches the complete amortization period, that vintage be fully retired irrespective of whether the associated equipment is still in service.

## MONITORING OF BOOK ACCUMULATED DEPRECIATION

The calculated accrued depreciation or amortization represents that portion of the depreciable cost which will not be allocated to expense through future depreciation accruals, if current forecasts of service life characteristics and net salvage materialize and are used as a basis for depreciation accounting. Thus, the calculated accrued depreciation provides a measure of the book accumulated depreciation. The use of this measure is recommended in the amortization of book accumulated depreciation variances to insure complete recovery of capital over the life of the property.

The recommended amortization of the variance between the book accumulated depreciation and the calculated accrued depreciation is based on an amortization period

equal to the composite remaining life for each property group where the variance exceeds five percent of the calculated accrued depreciation.

The composite remaining life for use in the calculation of accumulated depreciation variances is derived by developing the composite sum of the individual equal life group remaining lives in accordance with the following equation:

The book costs and lives of the several equal life groups, which are summed in the foregoing equation, are defined by the estimated future survivor curve. Inasmuch as book cost divided by life equals the whole life annual accrual, the foregoing equation reduces to the following form:

Or

$$\text{Composite Remaining Life} = \frac{\sum \text{Book Cost - Calc. Reserve}}{\sum \text{Whole Life Annual Accrual}}.$$

# PART IV. RESULTS OF STUDY

# PART IV. RESULTS OF STUDY

## QUALIFICATION OF RESULTS

The calculated annual and accrued depreciation are the principal results of the study. Continued surveillance and periodic revisions are normally required to maintain continued use of appropriate annual depreciation accrual rates. An assumption that accrual rates can remain unchanged over a long period of time implies a disregard for the inherent variability in service lives and salvage and for the change of the composition of property in service. The annual accrual rates and the accrued depreciation were calculated in accordance with the straight line method, using the equal life group procedure based on estimates which reflect considerations of current historical evidence and expected future conditions.

## DESCRIPTION OF DETAILED TABULATIONS

The service life estimates were based on judgment that incorporated statistical analysis of retirement data, discussions and review with management and consideration of estimates made for other electric utilities. The results of the statistical analysis of service life are presented in Part V beginning on V-2 of the Supporting Documents.

For each depreciable group analyzed by the retirement rate method, a chart depicting the original and estimated survivor curves followed by a tabular presentation of the original life table(s) plotted on the chart. The survivor curves estimated for the depreciable groups are shown as dark smooth curves on the charts. Each smooth survivor curve is denoted by a numeral followed by the curve type designation. The numeral used is the average life derived from the entire curve from 100 percent to zero percent surviving. The titles of the chart indicate the group, the symbol used to plot the points of the original life table, and the experience and placement bands of the life tables which where plotted. The experience band indicates the range of years for which retirements were used to develop the stub survivor curve. The placements indicate, for the related experience band, the range of years of installations which appear in the experience.

The tables of the calculated annual depreciation applicable to depreciable assets as of December 31, 2015 are presented in account sequence starting on page VI-2 of the

Supporting Documents. The tables indicate the estimated average survivor curves used in the calculations. The tables set forth, for each installation year, the original cost, calculated accrued depreciation, and the calculated annual accrual.

# NEWFOUNDLAND AND LABRADOR HYDRO
# DEPRECIATION STUDY

NEWFOUNDLAND AND LABRADOR HYDRO
TABLE 1A. ESTIMATED SURVIVOR CURVES,ORIGINAL AND DEEMED COST AND ANNUAL ACCRUALS
RELATED TO PLANT IN SERVICE AS OF DECEMBER 31, 2015
LIFE

| ACCOUNT | ACCOUNT DESCRIPTION | SURVIVOR CURVE | NET SALVAGE PERCENTAGE | ORIGINAL COST DECEMBER 31, 2015 | BOOK DEPRECIATION RESERVE | FUTURE ACCRUALS | ACCRUAL AMOUNT | ORIGINAL COST ACCRUAL RATE | COMPOSITE REMAINING LIFE | DEEMED COST DECEMBER 31, 2015 | DEEMED COST ACCRUAL RATE | WHOLE LIFE ACCRUAL RATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A01. | AIRCRAFT LANDING STRIP | 33-R2 | 0 | 475,498 | 447,118 | 28,380 | 1,156 | 0.24 | 22.5 | 106,867 | 1.08 | 4.27 |
| A04. | AUXILIARY POWER SYSTEMS | 30-R4 | 0 | 6,054,939 | 2,863,282 | 3,191,657 | 142,690 | 2.36 | 21.0 | 3,875,070 | 3.68 | 3.55 |
| B01. | BATTERY AND POWER SYSTEMS | 26-L1.5 | 0 | 11,399,996 | 5,831,921 | 5,568,076 | 281,160 | 2.47 | 19.7 | 6,859,869 | 4.10 | 5.37 |
| B02. | BOILER SYSTEM | 40-R3 | 0 | 23,876,046 | 22,173,735 | 1,702,310 | 51,390 | 0.22 | 23.1 | 1,848,235 | 2.78 | 2.92 |
| B03. | BOOMS - TIMBER | 25-R2 | 0 | 175,556 | 68,815 | 106,740 | 12,386 | 7.06 | 8.6 | 112,339 | 11.03 | 5.52 |
| B04. | BRIDGES | 65-R4 | 0 | 4,254,290 | 3,356,067 | 898,223 | 19,633 | 0.46 | 42.7 | 965,004 | 2.03 | 1.64 |
| B05. | BUILDINGS - OTHER | 50-R0.5 | 0 | 69,176,761 | 31,590,131 | 37,586,631 | 954,632 | 1.38 | 39.3 | 40,332,978 | 2.37 | 4.42 |
| B06. | BUILDINGS - METAL | 55-R3 | 0 | 34,029,073 | 18,159,493 | 15,869,581 | 384,804 | 1.13 | 40.5 | 16,435,007 | 2.34 | 2.13 |
| B07. | BUS DUCT GENERATOR | 40-R4 | 0 | 1,456,108 | 546,113 | 909,995 | 30,373 | 2.09 | 29.1 | 985,315 | 3.08 | 2.66 |
| B08. | BUSWORK AND HARDWARE | 50-R4 | 0 | 7,307,906 | 4,510,152 | 2,797,755 | 86,974 | 1.19 | 30.4 | 3,340,456 | 2.60 | 2.13 |
| C01. | CABLES - TELECONTROL | 30-R4 | 0 | 2,643,339 | 2,286,539 | 356,800 | 13,452 | 0.51 | 26.5 | 393,321 | 3.42 | 3.55 |
| C02. | CABLE - SUBMARINE | 45-R4 | 0 | 8,901,116 | 6,446,852 | 2,454,264 | 113,135 | 1.27 | 20.9 | 2,776,722 | 4.07 | 2.37 |
| C03. | CABLES - UNDERGROUND | 60-S4 | 0 | 2,837,546 | 1,019,407 | 1,818,138 | 36,892 | 1.30 | 46.1 | 1,905,314 | 1.94 | 1.72 |
| C04. | CABLES - ABOVE GROUND | 60-R4 | 0 | 10,550,929 | 6,547,333 | 4,003,596 | 100,721 | 0.95 | 36.8 | 4,494,725 | 2.24 | 1.77 |
| C06. | CAPACITORS | 35-R3 | 0 | 994,744 | 457,993 | 536,751 | 64,049 | 6.44 | 8.3 | 690,109 | 9.28 | 3.33 |
| C07. | CHEMICAL FEED SYSTEMS | 45-R4 | 0 | 509,132 | 495,386 | 13,747 | 338 | 0.07 | 20.6 | 18,552 | 1.82 | 2.37 |
| C09. | CIRCUIT BREAKERS | 60-R2.5 | 0 | 39,656,672 | 9,636,653 | 30,020,020 | 678,934 | 1.71 | 43.6 | 31,594,197 | 2.15 | 2.21 |
| C10. | COMPRESSED AIR SYSTEMS | 41-R1.5 | 0 | 16,666,710 | 3,115,906 | 13,550,805 | 505,554 | 3.03 | 26.8 | 14,222,905 | 3.55 | 4.00 |
| C11. | COMPUTERS | 5-SQ | 0 | 4,899,775 | 2,343,713 | 2,556,063 | 633,911 | 12.94 | 4.0 | 4,407,813 | 14.38 | 20.00 |
| C12. | CONDENSERS | 55-R3 | 0 | 125,930 | 125,930 | 0 | 0 | 0.00 | 15.1 | 0 | - | 2.13 |
| C13. | CONDUCTOR - TRANSMISSION | 60-R3 | 0 | 67,322,774 | 28,952,047 | 38,370,727 | 1,185,060 | 1.76 | 31.8 | 42,025,239 | 2.82 | 1.96 |
| C14. | CONDUCTOR - DISTRIBUTION | 45-R3 | 0 | 34,320,050 | 16,853,643 | 17,466,406 | 547,899 | 1.60 | 30.2 | 18,601,762 | 2.95 | 2.60 |
| C15. | CONTROL, METERING, RELAYING | 40-R3 | 0 | 29,645,208 | 13,067,444 | 16,577,763 | 599,361 | 2.02 | 27.7 | 18,702,830 | 3.20 | 2.92 |
| C16. | COOLING SYSTEMS | 40-R1.5 | 0 | 10,007,038 | 2,674,586 | 7,332,452 | 261,458 | 2.61 | 28.0 | 7,732,067 | 3.38 | 4.10 |
| C17. | COUNTERPOISE | 55-R2.5 | 0 | 3,623,089 | 1,556,773 | 2,066,316 | 63,340 | 1.75 | 32.2 | 2,310,209 | 2.74 | 2.39 |
| C18. | CRANES | 70-R3 | 0 | 6,902,142 | 1,299,150 | 5,602,992 | 133,894 | 1.94 | 41.8 | 6,044,509 | 2.22 | 1.69 |
| D01. | DAMS, DYKES, CANALS AND TUNNELS | 110-R4 | 0 | 361,909,256 | 35,352,203 | 326,557,053 | 4,330,896 | 1.20 | 75.4 | 340,976,393 | 1.27 | 0.97 |
| D02. | DIESEL SYSTEMS AND ENGINES | 25-L0.5 | 0 | 41,897,351 | 18,893,624 | 23,003,727 | 1,182,488 | 2.82 | 19.1 | 27,128,109 | 4.36 | 6.96 |
| D03. | DISCONNECT SWITCHES | 55-R2.5 | 0 | 20,883,528 | 6,740,368 | 14,143,160 | 336,802 | 1.61 | 41.5 | 15,314,119 | 2.20 | 2.39 |
| D04. | DYKES AND LINERS | 42-L1.5 | 0 | 2,477,333 | 1,799,505 | 677,828 | 21,022 | 0.85 | 30.1 | 745,693 | 2.82 | 3.36 |
| E01. | ELEVATORS | 45-S5 | 0 | 89,800 | 89,800 | 0 | 0 | 0.00 | 4.5 | 0 | - | 2.25 |
| E02. | EMS EQUIPMENT | 35-R2.5 | 0 | 12,917,219 | 12,757,417 | 159,802 | 6,392 | 0.05 | 25.0 | 189,571 | 3.37 | 3.68 |
| E03. | ENVIRONMENTAL EQUIPMENT | 45-R2.5 | 0 | 935,876 | 678,187 | 257,689 | 11,409 | 1.22 | 22.6 | 349,053 | 3.27 | 2.90 |
| F01. | FALL ARREST EQUIPMENT | 15-R4 | 0 | 2,509,020 | 1,215,404 | 1,293,616 | 123,050 | 4.90 | 10.5 | 2,007,509 | 6.13 | 7.09 |
| F02. | FENCING | 52-R3 | 0 | 7,555,589 | 3,627,286 | 3,928,303 | 93,592 | 1.24 | 41.4 | 4,183,349 | 2.24 | 2.25 |
| F03. | FIRE FIGHTING EQUIPMENT | 50-R4 | 0 | 13,906,919 | 5,568,798 | 8,338,121 | 194,950 | 1.40 | 42.8 | 8,924,743 | 2.18 | 2.13 |
| F04. | FOOTINGS AND FOUNDATIONS | 65-R3 | 0 | 20,413,239 | 8,981,394 | 11,431,845 | 263,514 | 1.29 | 42.5 | 12,276,179 | 2.15 | 1.81 |
| F05. | FREQUENCY CONVERSION | 45-S4 | 0 | 2,453,577 | 1,758,713 | 694,864 | 19,595 | 0.80 | 35.5 | 755,877 | 2.59 | 2.30 |
| F06. | FUEL SYSTEMS | 50-R1.5 | 0 | 28,513,898 | 9,915,217 | 18,598,681 | 542,202 | 1.90 | 34.3 | 19,575,128 | 2.77 | 3.36 |
| G01. | GAS TURBINE SYSTEMS | 45-R3 | 0 | 69,325,761 | 25,791,118 | 43,534,643 | 1,160,219 | 1.67 | 37.3 | 46,097,528 | 2.52 | 2.60 |
| G02. | GATES | 80-R4 | 0 | 19,048,533 | 3,368,711 | 15,679,823 | 320,794 | 1.68 | 48.8 | 16,550,695 | 1.94 | 1.[illegible] |
| G03. | GENERATORS | 65-S3 | 0 | 105,132,875 | 30,681,141 | 74,451,734 | 1,613,265 | 1.53 | 45.4 | 79,119,107 | 2.04 | 1.[illegible] |
| G04. | GENERATOR - WINDINGS | 50-S3 | 0 | 24,614,758 | 9,576,304 | 15,038,454 | 321,672 | 1.31 | 46.7 | 17,789,053 | 1.81 | 2.[illegible] |
| G05. | GLYCOL SYSTEMS | 40-S3 | 0 | 530,654 | 446,507 | 84,147 | 4,831 | 0.91 | 17.4 | 98,436 | 4.91 | 2.[illegible] |
| G06. | GOVENORS | 45-S4 | 0 | 7,840,659 | 2,139,962 | 5,700,697 | 303,354 | 3.87 | 18.5 | 6,562,987 | 4.62 | 2.[illegible] |
| G07. | GROUND WIRE SYSTEM | 55-R4 | 0 | 10,370,352 | 3,450,583 | 6,919,769 | 182,386 | 1.76 | 37.3 | 7,515,444 | 2.43 | 1.[illegible] |
| I02. | INSTRUMENTATION | 30-L0.5 | 0 | 5,967,398 | 5,010,716 | 956,682 | 38,194 | 0.64 | 25.0 | 1,113,173 | 3.43 | 5.[illegible] |
| I03. | INSULATORS | 35-L3 | 0 | 41,988,322 | 20,326,481 | 21,661,840 | 1,002,854 | 2.39 | 21.6 | 25,983,406 | 3.86 | 3.23 |
| I04. | INTAKE STRUCTURES | 110-R4 | 0 | 19,436,445 | 1,973,440 | 17,463,005 | 231,764 | 1.19 | 75.3 | 18,225,951 | 1.27 | 0.97 |
| I05. | INVERTERS | 25-S1.5 | 0 | 521,505 | 371,033 | 150,471 | 12,485 | 2.39 | 6.4 | 176,682 | 7.07 | 4.[illegible] |
| L03. | LAND IMPROVEMENTS | 75-R3 | 0 | 14,196,794 | 9,017,193 | 5,179,601 | 96,403 | 0.68 | 53.7 | 5,735,273 | 1.68 | 1.[illegible] |
| L04. | LIGHTING SYSTEMS | 50-R4 | 0 | 926,303 | 557,052 | 369,251 | 8,923 | 0.96 | 41.4 | 483,472 | 1.85 | 2.[illegible] |
| L05. | LIGHTNING ARRESTORS | 58-R3 | 0 | 6,193,610 | 2,439,676 | 3,753,934 | 84,364 | 1.36 | 44.5 | 3,984,825 | 2.12 | 2.[illegible] |
| L06. | LINE COUPLING EQUIPMENT | 24-R5 | 0 | 11,226 | 11,226 | 0 | 0 | 0.00 | 0.0 | 0 | - | 4.[illegible] |
| M01. | MAIN BREAKERS | 42-R0.5 | 0 | 552,940 | 289,587 | 263,353 | 7,867 | 1.42 | 33.2 | 288,042 | 2.73 | 5.[illegible] |
| M02. | MARINE TERMINAL | 65-R4 | 0 | 3,833,871 | 3,229,543 | 604,328 | 9,669 | 0.25 | 62.5 | 860,754 | 1.12 | 1.[illegible] |
| M03. | METALCLAD SWITCHGEAR CUB/EQU 4kv/600 | 45-R4 | 0 | 2,233,645 | 1,718,481 | 515,163 | 14,823 | 0.66 | 31.5 | 669,662 | 2.21 | 2.[illegible] |
| M04. | METER TEST SWITCHES | 35-R5 | 0 | 58,301 | 47,500 | 10,800 | 928 | 1.59 | 11.6 | 13,519 | 6.86 | 2.[illegible] |
| M05. | METERING TANKS | 37-R3 | 0 | 660,416 | 283,977 | 376,440 | 12,873 | 1.95 | 29.2 | 438,378 | 2.94 | 3.[illegible] |
| M06. | METERS - DIGITAL | 20-L3 | 0 | 5,874,668 | 2,181,741 | 3,692,927 | 285,363 | 4.86 | 12.9 | 4,566,868 | 6.25 | 5.[illegible] |
| M07. | METERS - ANALOGUE | 25-L2 | 0 | 698,384 | 659,749 | 38,635 | 4,235 | 0.61 | 9.1 | 76,225 | 5.56 | 5.[illegible] |
| M08. | METERS - OTHER | 22-L4 | 0 | 262,853 | 144,342 | 118,512 | 10,414 | 3.96 | 11.4 | 166,747 | 6.25 | 4.[illegible] |
| M10. | MISCELLANEOUS UNITS OF PROPERTY | 22-R1.5 | 0 | 25,815,956 | 10,083,214 | 15,732,742 | 887,243 | 3.44 | 17.7 | 24,143,424 | 3.67 | 6.[illegible] |

Revision 2 - October 16, 2017
Exhibit 11 - Depreciation Study
Page 50 of 633

# NEWFOUNDLAND AND LABRADOR HYDRO
# DEPRECIATION STUDY

NEWFOUNDLAND AND LABRADOR HYDRO
TABLE 1A. ESTIMATED SURVIVOR CURVES,ORIGINAL AND DEEMED COST AND ANNUAL ACCRUALS
RELATED TO PLANT IN SERVICE AS OF DECEMBER 31, 2015
LIFE

| ACCOUNT | ACCOUNT DESCRIPTION | SURVIVOR CURVE | NET SALVAGE PERCENTAGE | ORIGINAL COST DECEMBER 31, 2015 | BOOK DEPRECIATION RESERVE | FUTURE ACCRUALS | ACCRUAL AMOUNT | ORIGINAL COST ACCRUAL RATE | COMPOSITE REMAINING LIFE | DEEMED COST DECEMBER 31, 2015 | DEEMED COST ACCRUAL RATE | WHOLE LIFE ACCRUAL RATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M11. | MOBILE - A.T.V.'S AND SNOWMOBILES | 6-L3 | 20 | 1,906,739 | 988,839 | 536,552 | 132,832 | 6.97 | 4.0 | 1,630,167 | 8.15 | 15.02 |
| M12. | MOBILE - AIR COMPRESSOR ATTACHMENT AND BOAT | 20-L0 | 20 | 432,046 | 322,829 | 22,807 | 1,321 | 0.31 | 17.3 | 131,898 | 1.00 | 7.59 |
| M13. | MOBILE - ARGO'S | 9-R5 | 20 | 287,287 | 270,068 | (40,239) | 0 | 0.00 | 0.0 | 180,781 | - | 9.08 |
| M14. | MOBILE - FLEX/FORK/LOAD/GRADE/MUSK/TRAILER | 18-L3 | 20 | 10,581,312 | 4,436,000 | 4,029,050 | 299,132 | 2.83 | 13.5 | 7,185,044 | 4.16 | 5.03 |
| M16. | MULTIPLEX EQUIPMENT | 18-S1.5 | 0 | 2,812,217 | 2,220,728 | 591,489 | 52,487 | 1.87 | 11.3 | 822,074 | 6.38 | 6.67 |
| O01. | OFFICE EQUIPMENT | 20-SQ | 0 | 1,286,440 | 670,958 | 615,481 | 40,943 | 3.18 | 15.0 | 731,009 | 5.60 | 5.00 |
| O02. | OFFICE FURNITURE | 20-SQ | 0 | 1,477,990 | 866,277 | 611,713 | 45,350 | 3.07 | 13.5 | 743,513 | 6.10 | 5.00 |
| P01. | P.C.B. STORAGE CONTAINER | 30-R4 | 0 | 42,480 | 41,427 | 1,052 | 137 | 0.32 | 7.7 | 1,483 | 9.24 | 3.55 |
| P02. | PABX - PRIVATE AUTO BRANCH EXCHANGE | 20-R4 | 0 | 1,181,009 | 955,817 | 225,191 | 21,221 | 1.80 | 10.6 | 277,879 | 7.64 | 5.32 |
| P03. | PENSTOCK | 70-R4 | 0 | 58,908,421 | 16,867,332 | 42,041,089 | 1,255,120 | 2.13 | 33.4 | 44,875,320 | 2.80 | 1.52 |
| P04. | POLE CRIBS AND POLE HARDWARE | 35-S2.5 | 0 | 118,371,156 | 40,540,863 | 77,830,293 | 3,088,060 | 2.61 | 24.0 | 82,813,901 | 3.73 | 3.15 |
| P05. | POLE STRUCTURES - WOOD | 57-R3 | 0 | 129,790,285 | 48,775,465 | 81,014,821 | 2,175,325 | 1.68 | 36.3 | 89,077,051 | 2.44 | 2.06 |
| P06. | POLES - CONCRETE | 25-R4 | 0 | 333,760 | 307,440 | 26,320 | 1,240 | 0.37 | 3.0 | 55,346 | 2.24 | 4.26 |
| P07. | POLES - WOOD | 43-R1 | 0 | 72,604,630 | 27,332,178 | 45,272,452 | 1,392,688 | 1.92 | 32.2 | 49,437,902 | 2.82 | 4.34 |
| P08. | POWER LINE CARRIER | 25-R3 | 0 | 4,971,572 | 4,329,788 | 641,785 | 40,639 | 0.82 | 14.6 | 798,185 | 5.09 | 4.64 |
| P09. | POWER SYSTEMS | 20-L3 | 0 | 664,592 | 342,360 | 322,232 | 31,737 | 4.78 | 10.0 | 457,452 | 6.94 | 5.66 |
| P10. | POWERHOUSE | 75-R3 | 0 | 93,718,745 | 20,425,400 | 73,293,346 | 1,617,203 | 1.73 | 45.2 | 77,547,345 | 2.09 | 1.57 |
| P11. | PRINTERS | 6-SQ | 0 | 1,038,001 | 818,313 | 219,688 | 50,319 | 4.85 | 4.4 | 968,970 | 5.19 | 16.67 |
| P12. | PROTECTIVE CONTROL AND RELAY PANELS | 35-R3 | 0 | 9,507,129 | 3,266,574 | 6,240,555 | 214,367 | 2.25 | 29.1 | 7,232,549 | 2.96 | 3.33 |
| R01. | RADIO TOWERS (WOOD OR STEEL) | 48-R3 | 0 | 9,759,106 | 7,079,596 | 2,679,510 | 71,439 | 0.73 | 37.0 | 3,006,850 | 2.38 | 2.44 |
| R02. | RADIOS - FIXED MICROWAVE EQUIPMENT | 19-R5 | 0 | 6,212,764 | 4,646,541 | 1,566,223 | 159,307 | 2.56 | 9.8 | 1,854,531 | 8.59 | 5.37 |
| R03. | RADIOS - FIXED UHF EQUIPMENT | 15-L0.5 | 0 | 101,662 | 36,875 | 64,787 | 6,085 | 5.99 | 10.6 | 81,822 | 7.44 | 11.00 |
| R04. | RADIOS - FIXED VHF EQUIPMENT | 19-R3 | 0 | 560,166 | 448,857 | 111,309 | 10,243 | 1.83 | 10.9 | 153,938 | 6.65 | 6.08 |
| R05. | RADIOS - MOBILE VHF BASE STATION | 15-R4 | 0 | 7,278,664 | 5,004,461 | 2,274,203 | 326,656 | 4.49 | 7.0 | 3,124,097 | 10.46 | 7.09 |
| R06. | RAMPS - YARD STORAGE | 25-R3 | 0 | 1,593,558 | 784,653 | 808,905 | 48,198 | 3.02 | 16.8 | 935,272 | 5.15 | 4.64 |
| R07. | REACTORS AND RESISTORS | 40-S4 | 0 | 1,225,065 | 415,447 | 809,618 | 37,859 | 3.09 | 21.4 | 903,491 | 4.19 | 2.58 |
| R08. | RECLOSERS | 48-R3 | 0 | 7,158,607 | 3,012,684 | 4,145,922 | 105,835 | 1.48 | 38.1 | 4,572,762 | 2.31 | 2.44 |
| R09. | REGULATORS | 40-S0.5 | 0 | 5,667,640 | 2,392,726 | 3,274,914 | 108,120 | 1.91 | 29.3 | 3,706,121 | 2.92 | 3.56 |
| R11. | REVENUE METERING | 35-R3 | 0 | 1,242,916 | 495,989 | 746,926 | 35,790 | 2.88 | 20.9 | 849,542 | 4.21 | 3.33 |
| R12. | RIGHT-OF-WAYS | 65-R4 | 0 | 21,729,649 | 10,327,231 | 11,402,418 | 296,842 | 1.37 | 38.4 | 12,488,097 | 2.38 | 1.64 |
| R13. | ROADS | 60-R4 | 0 | 84,440,747 | 16,404,114 | 68,036,633 | 2,225,706 | 2.64 | 30.5 | 75,174,354 | 2.96 | 1.77 |
| R14. | ROUTERS AND LAN | 5-SQ | 0 | 2,730,978 | 1,833,487 | 897,491 | 216,573 | 7.93 | 4.1 | 2,448,737 | 8.84 | 20.00 |
| R15. | RUNNER | 55-R5 | 0 | 11,669,844 | 6,299,567 | 5,370,277 | 424,434 | 3.64 | 12.7 | 6,821,838 | 6.22 | 1.86 |
| S01. | SCADA EQUIPMENT | 20-L3 | 0 | 4,929,933 | 2,829,101 | 2,100,832 | 154,652 | 3.14 | 13.6 | 2,481,772 | 6.23 | 5.66 |
| S02. | SECTIONALIZERS | 25-R5 | 0 | 154,009 | 126,212 | 27,797 | 6,911 | 4.49 | 4.0 | 45,666 | 15.13 | 4.08 |
| S03. | SERVERS | 7-SQ | 0 | 3,019,204 | 2,756,280 | 262,924 | 47,011 | 1.56 | 5.6 | 1,643,300 | 2.86 | 14.29 |
| S04. | SEWAGE DISPOSAL SYSTEM | 55-R4 | 0 | 2,919,319 | 1,894,968 | 1,024,351 | 24,407 | 0.84 | 41.4 | 1,121,167 | 2.18 | 1.94 |
| S05. | SOFTWARE | 7-SQ | 0 | 10,081,799 | 3,806,822 | 6,274,977 | 1,826,510 | 18.12 | 3.4 | 8,980,374 | 20.34 | 14.29 |
| S06. | SPILLWAY STRUCTURES | 110-R4 | 0 | 28,120,270 | 3,203,543 | 24,916,728 | 331,244 | 1.18 | 75.2 | 26,004,636 | 1.27 | 0.97 |
| S07. | STACKS | 55-R4 | 0 | 7,850,850 | 3,172,485 | 4,678,365 | 93,981 | 1.20 | 48.2 | 4,868,525 | 1.93 | 1.94 |
| S08. | STATIC EXCITATION SYSTEM | 32-R4 | 0 | 8,333,065 | 3,979,751 | 4,353,314 | 576,637 | 6.92 | 6.5 | 5,117,789 | 11.27 | 3.[illegible] |
| S09. | STATIC EXCITATION - TRANSFORMERS | 45-R4 | 0 | 734,327 | 727,391 | 6,936 | 429 | 0.06 | 15.7 | 16,538 | 2.59 | 2.[illegible] |
| S10. | STATION SERVICE | 50-R4 | 0 | 5,233,336 | 1,741,249 | 3,492,087 | 120,651 | 2.31 | 28.1 | 3,966,436 | 3.04 | 2.[illegible] |
| S11. | STOP LOGS | 65-R4 | 0 | 3,114,097 | 643,196 | 2,470,901 | 72,339 | 2.32 | 34.2 | 2,650,931 | 2.73 | 1.[illegible] |
| S12. | STORAGE PALLETS AND RACKINGS | 30-R3 | 0 | 14,403 | 14,403 | 0 | 0 | 0.00 | 0.0 | 0 | - | 3.[illegible] |
| S13. | STORM AND YARD DRAINAGE | 55-R4 | 0 | 1,308,713 | 1,054,925 | 253,788 | 6,537 | 0.50 | 38.8 | 283,067 | 2.31 | 1.94 |
| S14. | STREET LIGHTS | 20-R2 | 0 | 3,874,989 | 1,657,192 | 2,217,797 | 172,083 | 4.44 | 12.5 | 2,805,557 | 6.13 | 6.[illegible] |
| S15. | STRUCTURAL SUPPORTS (WOOD OR STEEL) | 55-R4 | 0 | 11,677,609 | 6,274,387 | 5,403,222 | 147,181 | 1.26 | 35.4 | 6,251,538 | 2.35 | 1.94 |
| S17. | SUMP SYSTEMS | 35-R4 | 0 | 667,245 | 135,218 | 532,027 | 29,713 | 4.45 | 17.9 | 561,992 | 5.29 | 3.04 |
| S18. | SURGE SYSTEMS | 60-R4 | 0 | 6,972,889 | 3,352,973 | 3,619,917 | 96,658 | 1.39 | 37.5 | 4,069,890 | 2.37 | 1.[illegible] |
| S19. | STATION SWITCHING | 38-S0.5 | 0 | 11,650,032 | 4,719,809 | 6,930,224 | 267,874 | 2.30 | 25.9 | 7,525,863 | 3.56 | 3.[illegible] |
| S20. | SWITCHING SYSTEMS - L.V. | 60-R5 | 0 | 2,304,609 | 396,950 | 1,907,659 | 59,963 | 2.60 | 31.8 | 2,071,699 | 2.89 | 1.[illegible] |
| T01. | TELECONTROL SYSTEM | 25-L1.5 | 0 | 12,429,279 | 6,824,711 | 5,604,568 | 304,406 | 2.45 | 18.4 | 6,362,279 | 4.78 | 5.[illegible] |
| T02. | TEST EQUIPMENT | 20-SQ | 0 | 1,955,314 | 1,128,984 | 826,330 | 55,804 | 2.85 | 14.8 | 955,358 | 5.84 | 5.[illegible] |
| T03. | TOOLS AND EQUIPMENT | 20-SQ | 0 | 11,434,328 | 6,018,424 | 5,415,904 | 378,698 | 3.31 | 14.3 | 6,366,862 | 5.95 | 5.[illegible] |
| T04. | TOWERS | 65-R4 | 0 | 77,739,424 | 27,526,269 | 50,213,155 | 1,256,447 | 1.62 | 38.9 | 54,042,115 | 2.32 | 1.[illegible] |
| T05. | TRANSFORMERS - OTHER | 55-R3 | 0 | 89,255,274 | 37,368,104 | 51,887,170 | 1,599,600 | 1.79 | 31.8 | 55,908,373 | 2.86 | 2.[illegible] |
| T06. | TRANSFORMERS - PAD MOUNT | 40-R1.5 | 0 | 17,723,652 | 2,188,073 | 15,535,579 | 420,766 | 2.37 | 36.8 | 16,335,856 | 2.58 | 4.[illegible] |
| T07. | TRANSFORMERS - POLE MOUNTED | 30-L1 | 0 | 37,040,457 | 10,664,694 | 26,375,763 | 1,145,163 | 3.09 | 22.9 | 29,543,794 | 3.88 | 5.[illegible] |
| T09. | TURBINES | 55-R2.5 | 0 | 65,159,636 | 27,353,903 | 37,805,733 | 1,233,955 | 1.89 | 29.9 | 42,271,663 | 2.92 | 2.[illegible] |

NEWFOUNDLAND AND LABRADOR HYDRO
TABLE 1A. ESTIMATED SURVIVOR CURVES,ORIGINAL AND DEEMED COST AND ANNUAL ACCRUALS
RELATED TO PLANT IN SERVICE AS OF DECEMBER 31, 2015
LIFE

| ACCOUNT | ACCOUNT DESCRIPTION | SURVIVOR CURVE | NET SALVAGE PERCENTAGE | ORIGINAL COST DECEMBER 31, 2015 | BOOK DEPRECIATION RESERVE | FUTURE ACCRUALS | ACCRUAL AMOUNT | ORIGINAL COST ACCRUAL RATE | COMPOSITE REMAINING LIFE | DEEMED COST DECEMBER 31, 2015 | DEEMED COST ACCRUAL RATE | WHOLE LIFE ACCRUAL RATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T10. | HOLYROOD GAS TURBINE - COMBUSTOR OVERHAUL | 3-SQ | 0 | 2,206,062 | 40,444 | 2,165,618 | 866,247 | 39.27 | 2.5 | 2,206,062 | 39.27 | 33.33 |
| T11. | HOLYROOD GAS TURBINE - TURBINE OVERHAUL | 6-SQ | 0 | 2,206,062 | 40,444 | 2,165,618 | 393,749 | 17.85 | 5.5 | 2,206,062 | 17.85 | 16.67 |
| T12. | HOLYROOD GAS TURBINE - COMPRESSOR OVERHAUL | 12-SQ | 0 | 3,088,487 | 56,622 | 3,031,865 | 263,640 | 8.54 | 11.5 | 3,088,487 | 8.54 | 8.33 |
| V01. | VACUUM CLEANING SYSTEM | 60-R4 | 0 | 72,451 | 66,980 | 5,471 | 212 | 0.29 | 25.8 | 6,099 | 3.48 | 1.77 |
| V02. | VALVES - PENSTOCK | 65-R3 | 0 | 7,567,760 | 2,366,964 | 5,200,796 | 128,332 | 1.70 | 40.1 | 5,558,323 | 2.31 | 1.81 |
| V03. | VEHICLES - 1 TON | 8-L4 | 15 | 51,648 | 16,140 | 27,761 | 5,047 | 9.77 | 5.5 | 51,648 | 9.77 | 11.29 |
| V04. | VEHICLES - 3/4 TON AND UNDER | 7-L3 | 15 | 5,167,170 | 3,260,796 | 1,131,298 | 203,617 | 3.94 | 5.6 | 4,033,711 | 5.05 | 13.71 |
| V05. | VEHICLES - BOOMS/BODIES/CRANES/CAB/CHASSIS | 12-L3 | 15 | 14,954,546 | 5,943,877 | 6,767,488 | 839,148 | 5.61 | 8.1 | 10,855,821 | 7.73 | 8.02 |
| V06. | VEHICLES - CARS, STATION WAGONS AND VAN | 6-L3 | 15 | 1,795,372 | 1,516,681 | 9,385 | 2,081 | 0.12 | 4.5 | 1,134,905 | 0.18 | 15.96 |
| V07. | VEHICLES - DUMP TRUCKS | 10-L5 | 15 | 11,535 | 11,535 | (1,730) | 0 | 0.00 | 0.0 | 0 | - | 10.28 |
| W01. | WATER REGULATING STRUCTURES | 65-S4 | 0 | 22,451,738 | 5,101,189 | 17,350,549 | 415,932 | 1.85 | 41.3 | 18,454,117 | 2.25 | 1.59 |
| W02. | WATER SUPPLY SYSTEMS | 30-L4 | 0 | 3,394,554 | 1,790,681 | 1,603,873 | 105,993 | 3.12 | 14.0 | 1,972,019 | 5.37 | 3.53 |
| W03. | WATER SYSTEMS - FEED | 55-R2.5 | 0 | 6,531,260 | 3,595,245 | 2,936,015 | 74,656 | 1.14 | 37.0 | 3,023,065 | 2.47 | 2.39 |
| W04. | WATER TREATMENT | 55-R2.5 | 0 | 11,921,573 | 6,449,340 | 5,472,233 | 134,521 | 1.13 | 40.3 | 6,307,665 | 2.13 | 2.39 |
| | Sub-Total | | | 2,458,776,655 | 852,381,210 | 1,600,456,929 | 49,040,034 | 1.99 | | 1,756,107,129 | 2.79 | |

# NEWFOUNDLAND AND LABRADOR HYDRO
# DEPRECIATION STUDY

NEWFOUNDLAND AND LABRADOR HYDRO
TABLE 1A. ESTIMATED SURVIVOR CURVES,ORIGINAL AND DEEMED COST AND ANNUAL ACCRUALS
RELATED TO PLANT IN SERVICE AS OF DECEMBER 31, 2015
LIFE

| ACCOUNT | ACCOUNT DESCRIPTION | SURVIVOR CURVE | NET SALVAGE PERCENTAGE | ORIGINAL COST DECEMBER 31, 2015 | BOOK DEPRECIATION RESERVE | FUTURE ACCRUALS | ACCRUAL AMOUNT | ORIGINAL COST ACCRUAL RATE | COMPOSITE REMAINING LIFE | DEEMED COST DECEMBER 31, 2015 | DEEMED COST ACCRUAL RATE | WHOLE LIFE ACCRUAL RATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HOLYROOD ASSETS** | **TRUCATION DATE** | **3/31/2021** | | | | | | | | | | |
| A04.1 | AUXILIARY POWER SYSTEMS | 30-R4 | 0 | 620,866 | 313,020 | 307,846 | 58,749 | 9.46 | 5.2 | 492,554 | 11.93 | 24.32 |
| B01.1 | BATTERY AND POWER SYSTEMS | 26-L1.5 | 0 | 106,627 | 45,121 | 61,506 | 13,957 | 13.09 | 4.4 | 86,099 | 16.21 | 24.53 |
| B02.1 | BOILER SYSTEM | 40-R3 | 0 | 35,073,430 | 27,260,865 | 7,812,565 | 1,538,636 | 4.39 | 5.0 | 12,295,071 | 12.51 | 24.37 |
| B05.1 | BUILDINGS - OTHER | 50-R0.5 | 0 | 1,300,250 | 763,274 | 536,976 | 104,628 | 8.05 | 5.1 | 859,162 | 12.18 | 25.12 |
| B06.1 | BUILDINGS - METAL | 55-R3 | 0 | 72,011 | 39,551 | 32,460 | 6,195 | 8.60 | 5.2 | 51,935 | 11.93 | 24.35 |
| C01.1 | CABLES - TELECONTROL | 30-R4 | 0 | 89,750 | 63,121 | 26,629 | 5,121 | 5.71 | 5.2 | 42,606 | 12.02 | 24.32 |
| C03.1 | CABLES - UNDERGROUND | 60-S4 | 0 | 544,049 | 481,561 | 62,488 | 12,017 | 2.21 | 5.2 | 68,519 | 17.54 | 24.31 |
| C04.1 | CABLES - ABOVE GROUND | 60-R4 | 0 | 629,827 | 560,583 | 69,244 | 13,419 | 2.13 | 5.2 | 78,084 | 17.19 | 24.32 |
| C07.1 | CHEMICAL FEED SYSTEMS | 45-R4 | 0 | 77,164 | 66,656 | 10,508 | 2,024 | 2.62 | 5.2 | 16,813 | 12.04 | 24.32 |
| C12.1 | CONDENSERS | 55-R3 | 0 | 2,329,667 | 2,087,816 | 241,851 | 46,983 | 2.02 | 5.1 | 386,962 | 12.14 | 24.35 |
| C15.1 | CONTROL, METERING, RELAYING | 40-R3 | 0 | 119,880 | 48,437 | 71,443 | 13,634 | 11.37 | 5.2 | 115,036 | 11.85 | 24.37 |
| E03.1 | ENVIRONMENTAL EQUIPMENT | 45-R2.5 | 0 | 1,280,261 | 883,404 | 396,857 | 76,415 | 5.97 | 5.2 | 624,419 | 12.24 | 24.45 |
| F03.1 | FIRE FIGHTING EQUIPMENT | 50-R4 | 0 | 797,150 | 545,433 | 251,716 | 49,563 | 6.22 | 5.1 | 290,151 | 17.08 | 24.32 |
| F04.1 | FOOTINGS AND FOUNDATIONS | 65-R3 | 0 | 56,613 | 46,927 | 9,685 | 1,866 | 3.30 | 5.2 | 10,668 | 17.49 | 24.34 |
| F06.1 | FUEL SYSTEMS | 50-R1.5 | 0 | 13,309,152 | 7,877,261 | 5,431,891 | 1,050,852 | 7.90 | 5.2 | 8,233,153 | 12.76 | 24.70 |
| G01.1 | GAS TURBINE SYSTEMS | 45-R3 | 0 | 24,645 | 23,906 | 739 | 146 | 0.59 | 5.0 | 887 | 16.46 | 24.36 |
| G03.1 | GENERATORS | 65-S3 | 0 | 1,067,438 | 367,373 | 700,064 | 133,346 | 12.49 | 5.3 | 1,228,857 | 10.85 | 24.31 |
| G06.1 | GOVENORS | 45-S4 | 0 | 2,144,383 | 1,652,526 | 491,857 | 94,078 | 4.39 | 5.2 | 773,352 | 12.16 | 24.31 |
| I02.1 | INSTRUMENTATION | 30-L0.5 | 0 | 6,727,326 | 4,902,728 | 1,824,598 | 379,394 | 5.64 | 4.8 | 2,327,089 | 16.30 | 24.94 |
| I05.1 | INVERTERS | 25-S1.5 | 0 | 24,417 | 17,670 | 6,747 | 1,391 | 5.70 | 4.8 | 10,794 | 12.89 | 24.35 |
| L03.1 | LAND IMPROVEMENTS | 75-R3 | 0 | 5,766 | 4,965 | 801 | 153 | 2.65 | 5.2 | 1,281 | 11.94 | 24.34 |
| M02.1 | MARINE TERMINAL | 65-R4 | 0 | 468,523 | 358,934 | 109,589 | 20,895 | 4.46 | 5.2 | 175,342 | 11.92 | 24.32 |
| M10.1 | MISCELLANEOUS UNITS OF PROPERTY | 22-R1.5 | 0 | 1,611,947 | 407,422 | 1,204,525 | 236,325 | 14.66 | 5.1 | 1,583,560 | 14.92 | 25.26 |
| O02.1 | OFFICE FURNITURE | 20-SQ | 0 | 58,975 | 48,674 | 10,302 | 4,121 | 6.99 | 2.5 | 16,483 | 25.00 | 24.31 |
| P10.1 | POWERHOUSE | 75-R3 | 0 | 8,903,432 | 7,852,132 | 1,051,300 | 202,559 | 2.28 | 5.2 | 1,133,208 | 17.87 | 24.34 |
| P12.1 | PROTECTIVE CONTROL AND RELAY PANELS | 35-R3 | 0 | 106,685 | 65,531 | 41,154 | 7,899 | 7.40 | 5.2 | 65,847 | 12.00 | 24.38 |
| R13.1 | ROADS | 60-R4 | 0 | 1,859 | 1,635 | 224 | 43 | 2.31 | 5.2 | 248 | 17.35 | 24.32 |
| S07.1 | STACKS | 55-R4 | 0 | 9,202,119 | 6,183,907 | 3,018,212 | 582,779 | 6.33 | 5.2 | 4,786,711 | 12.17 | 24.32 |
| S08.1 | STATIC EXCITATION SYSTEM | 32-R4 | 0 | 1,461,435 | 1,004,244 | 457,191 | 332,027 | 22.72 | 1.4 | 729,359 | 45.52 | 24.32 |
| T03.1 | TOOLS AND EQUIPMENT | 20-SQ | 0 | 351,262 | 183,716 | 167,546 | 31,914 | 9.09 | 5.2 | 268,073 | 11.90 | 24.31 |
| T05.1 | TRANSFORMERS | 55-R3 | 0 | 126,690 | 38,007 | 88,683 | 16,924 | 13.36 | 5.2 | 126,690 | 13.36 | 24.35 |
| T09.1 | TURBINES | 55-R2.5 | 0 | 27,077,372 | 12,977,563 | 14,099,810 | 2,700,859 | 9.97 | 5.2 | 20,041,663 | 13.48 | 24.43 |
| W03.1 | WATER SYSTEMS - FEED | 55-R2.5 | 0 | 2,818,634 | 1,772,494 | 1,046,140 | 203,526 | 7.22 | 5.1 | 1,270,349 | 16.02 | 24.43 |
| W04.1 | WATER TREATMENT | 55-R2.5 | 0 | 2,792,962 | 1,648,626 | 1,144,336 | 219,631 | 7.86 | 5.2 | 1,772,842 | 12.39 | 24.43 |
| | Sub-Total | | | 121,382,565 | 80,595,081 | 40,787,483 | 8,162,069 | 6.72 | | 59,963,868 | 13.61 | |
| | TOTAL | | | 2,580,159,221 | 932,976,291 | 1,641,244,412 | 57,202,103 | 2.22 | | 1,816,070,997 | 3.15 | |

NEWFOUNDLAND AND LABRADOR HYDRO
TABLE 1B. ESTIMATED SURVIVOR CURVES,ORIGINAL AND DEEMED COST AND ANNUAL ACCRUALS
RELATED TO PLANT IN SERVICE AS OF DECEMBER 31, 2015
COST OF REMOVAL

| ACCOUNT | ACCOUNT DESCRIPTION | SURVIVOR CURVE | NET SALVAGE PERCENTAGE | ORIGINAL COST DECEMBER 31, 2015 | BOOK DEPRECIATION RESERVE | FUTURE ACCRUALS | ACCRUAL AMOUNT | ORIGINAL COST ACCRUAL RATE | COMPOSITE REMAINING LIFE | DEEMED COST DECEMBER 31, 2015 | DEEMED COST ACCRUAL RATE | WHOLE LIFE ACCRUAL RATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A01. | AIRCRAFT LANDING STRIP | 33-R2 | (6) | 475,498 | 0 | 28,530 | 1,374 | 0.29 | 22.5 | 106,867 | 1.29 | 0.43 |
| A04. | AUXILIARY POWER SYSTEMS | 30-R4 | (3) | 6,054,939 | 0 | 181,648 | 17,864 | 0.29 | 21.0 | 3,875,070 | 0.46 | 0.18 |
| B01. | BATTERY AND POWER SYSTEMS | 26-L1.5 | (3) | 11,399,996 | 0 | 342,000 | 18,808 | 0.16 | 19.7 | 6,859,869 | 0.27 | 0.27 |
| B02. | BOILER SYSTEM | 40-R3 | (8) | 23,876,046 | 0 | 1,910,084 | 104,912 | 0.43 | 23.1 | 1,848,235 | 5.68 | 0.44 |
| B03. | BOOMS - TIMBER | 25-R2 | 0 | 175,556 | 0 | 0 | 0 | 0.00 | 8.6 | 112,339 | - | - |
| B04. | BRIDGES | 65-R4 | (11) | 4,254,290 | 0 | 467,972 | 12,358 | 0.29 | 42.7 | 965,004 | 1.28 | 0.33 |
| B05. | BUILDINGS - OTHER | 50-R0.5 | (3) | 69,176,761 | 0 | 2,075,302 | 55,540 | 0.08 | 39.3 | 40,332,978 | 0.14 | 0.22 |
| B06. | BUILDINGS - METAL | 55-R3 | (3) | 34,029,073 | 0 | 1,020,872 | 32,294 | 0.10 | 40.5 | 16,435,007 | 0.20 | 0.11 |
| B07. | BUS DUCT GENERATOR | 40-R4 | (3) | 1,456,108 | 0 | 43,683 | 2,358 | 0.16 | 29.1 | 985,315 | 0.24 | 0.13 |
| B08. | BUSWORK AND HARDWARE | 50-R4 | (8) | 7,307,906 | 0 | 584,632 | 24,380 | 0.33 | 30.4 | 3,340,456 | 0.73 | 0.32 |
| C01. | CABLES - TELECONTROL | 30-R4 | (3) | 2,643,339 | 0 | 79,301 | 3,021 | 0.11 | 26.5 | 393,321 | 0.77 | 0.18 |
| C02. | CABLE - SUBMARINE | 45-R4 | (14) | 8,901,116 | 0 | 1,246,156 | 64,114 | 0.72 | 20.9 | 2,776,722 | 2.31 | 0.59 |
| C03. | CABLES - UNDERGROUND | 60-S4 | (14) | 2,837,546 | 0 | 397,257 | 11,201 | 0.39 | 46.1 | 1,905,314 | 0.59 | 0.43 |
| C04. | CABLES - ABOVE GROUND | 60-R4 | (14) | 10,550,929 | 0 | 1,477,130 | 48,135 | 0.46 | 36.8 | 4,494,725 | 1.07 | 0.44 |
| C06. | CAPACITORS | 35-R3 | (3) | 994,744 | 0 | 29,843 | 4,297 | 0.43 | 8.3 | 690,109 | 0.62 | 0.17 |
| C07. | CHEMICAL FEED SYSTEMS | 45-R4 | (6) | 509,132 | 0 | 30,548 | 1,808 | 0.35 | 20.6 | 18,552 | 9.75 | 0.24 |
| C09. | CIRCUIT BREAKERS | 60-R2.5 | (8) | 39,656,672 | 0 | 3,172,534 | 82,172 | 0.21 | 43.6 | 31,594,197 | 0.26 | 0.33 |
| C10. | COMPRESSED AIR SYSTEMS | 41-R1.5 | 0 | 16,666,710 | 0 | 0 | 0 | 0.00 | 26.8 | 14,222,905 | - | - |
| C11. | COMPUTERS | 5-SQ | 0 | 4,899,775 | 0 | 0 | 0 | 0.00 | 4.0 | 4,407,813 | - | - |
| C12. | CONDENSERS | 55-R3 | (3) | 125,930 | 0 | 3,778 | 250 | 0.20 | 15.1 | 0 | - | 0.11 |
| C13. | CONDUCTOR - TRANSMISSION | 60-R3 | (20) | 67,322,774 | 0 | 13,464,554 | 443,858 | 0.66 | 31.8 | 42,025,239 | 1.06 | 0.68 |
| C14. | CONDUCTOR - DISTRIBUTION | 45-R3 | (14) | 34,320,050 | 0 | 4,804,807 | 190,688 | 0.55 | 30.2 | 18,601,762 | 1.03 | 0.65 |
| C15. | CONTROL, METERING, RELAYING | 40-R3 | 0 | 29,645,208 | 0 | 0 | 0 | 0.00 | 27.7 | 18,702,830 | - | - |
| C16. | COOLING SYSTEMS | 40-R1.5 | (3) | 10,007,038 | 0 | 300,211 | 11,276 | 0.12 | 28.0 | 7,732,067 | 0.15 | 0.20 |
| C17. | COUNTERPOISE | 55-R2.5 | (6) | 3,623,089 | 0 | 217,385 | 7,511 | 0.21 | 32.2 | 2,310,209 | 0.33 | 0.24 |
| C18. | CRANES | 70-R3 | (3) | 6,902,142 | 0 | 207,064 | 5,088 | 0.07 | 41.8 | 6,044,509 | 0.08 | 0.09 |
| D01. | DAMS, DYKES, CANALS AND TUNNELS | 110-R4 | (8) | 361,909,256 | 0 | 28,952,740 | 385,472 | 0.10 | 75.4 | 340,976,393 | 0.11 | 0.15 |
| D02. | DIESEL SYSTEMS AND ENGINES | 25-L0.5 | (11) | 41,897,351 | 0 | 4,608,708 | 265,556 | 0.64 | 19.1 | 27,128,109 | 0.98 | 1.39 |
| D03. | DISCONNECT SWITCHES | 55-R2.5 | (3) | 20,883,528 | 0 | 626,505 | 19,129 | 0.09 | 41.5 | 15,314,119 | 0.12 | 0.12 |
| D04. | DYKES AND LINERS | 42-L1.5 | (8) | 2,477,333 | 0 | 198,186 | 8,047 | 0.32 | 30.1 | 745,693 | 1.08 | 0.50 |
| E01. | ELEVATORS | 45-S5 | (3) | 89,800 | 0 | 2,694 | 604 | 0.67 | 4.5 | 0 | - | 0.11 |
| E02. | EMS EQUIPMENT | 35-R2.5 | 0 | 12,917,219 | 0 | 0 | 0 | 0.00 | 25.0 | 189,571 | - | - |
| E03. | ENVIRONMENTAL EQUIPMENT | 45-R2.5 | 0 | 935,876 | 0 | 0 | 0 | 0.00 | 22.6 | 349,053 | - | - |
| F01. | FALL ARREST EQUIPMENT | 15-R4 | 0 | 2,509,020 | 0 | 0 | 0 | 0.00 | 10.5 | 2,007,509 | - | - |
| F02. | FENCING | 52-R3 | (3) | 7,555,589 | 0 | 226,668 | 6,653 | 0.09 | 41.4 | 4,183,349 | 0.16 | 0.11 |
| F03. | FIRE FIGHTING EQUIPMENT | 50-R4 | 0 | 13,906,919 | 0 | 0 | 0 | 0.00 | 42.8 | 8,924,743 | - | - |
| F04. | FOOTINGS AND FOUNDATIONS | 65-R3 | (8) | 20,413,239 | 0 | 1,633,059 | 43,987 | 0.22 | 42.5 | 12,276,179 | 0.36 | 0.27 |
| F05. | FREQUENCY CONVERSION | 45-S4 | 0 | 2,453,577 | 0 | 0 | 0 | 0.00 | 35.5 | 755,877 | - | - |
| F06. | FUEL SYSTEMS | 50-R1.5 | (11) | 28,513,898 | 0 | 3,136,529 | 91,557 | 0.32 | 34.3 | 19,575,128 | 0.47 | 0.67 |
| G01. | GAS TURBINE SYSTEMS | 45-R3 | (2) | 69,325,761 | 0 | 1,386,515 | 43,819 | 0.07 | 37.3 | 46,097,528 | 0.10 | 0.08 |
| G02. | GATES | 80-R4 | (8) | 19,048,533 | 0 | 1,523,882 | 32,043 | 0.17 | 48.8 | 16,550,695 | 0.19 | 0.20 |
| G03. | GENERATORS | 65-S3 | (8) | 105,132,875 | 0 | 8,410,630 | 211,119 | 0.21 | 45.4 | 79,119,107 | 0.27 | 0.35 |
| G04. | GENERATOR - WINDINGS | 50-S3 | (8) | 24,614,758 | 0 | 1,969,180 | 42,361 | 0.17 | 46.7 | 17,789,053 | 0.24 | 0.32 |
| G05. | GLYCOL SYSTEMS | 40-S3 | (8) | 530,654 | 0 | 42,452 | 2,440 | 0.46 | 17.4 | 98,436 | 2.48 | 2.48 |
| G06. | GOVENORS | 45-S4 | (14) | 7,840,659 | 0 | 1,097,693 | 64,598 | 0.82 | 18.5 | 6,562,987 | 0.98 | 0.98 |
| G07. | GROUND WIRE SYSTEM | 55-R4 | (6) | 10,370,352 | 0 | 622,221 | 19,634 | 0.19 | 37.3 | 7,515,444 | 0.26 | 0.29 |
| I02. | INSTRUMENTATION | 30-L0.5 | 0 | 5,967,398 | 0 | 0 | 0 | 0.00 | 25.0 | 1,113,173 | - | - |
| I03. | INSULATORS | 35-L3 | 0 | 41,988,322 | 0 | 0 | 0 | 0.00 | 21.6 | 25,983,406 | - | - |
| I04. | INTAKE STRUCTURES | 110-R4 | (8) | 19,436,445 | 0 | 1,554,916 | 20,774 | 0.11 | 75.3 | 18,225,951 | 0.11 | 0.15 |
| I05. | INVERTERS | 25-S1.5 | (8) | 521,505 | 0 | 41,721 | 17,362 | 3.33 | 6.4 | 176,682 | 9.83 | 0.72 |
| L03. | LAND IMPROVEMENTS | 75-R3 | 0 | 14,196,794 | 0 | 0 | 0 | 0.00 | 53.7 | 5,735,273 | - | - |
| L04. | LIGHTING SYSTEMS | 50-R4 | 0 | 926,303 | 0 | 0 | 0 | 0.00 | 41.4 | 483,472 | - | - |
| L05. | LIGHTNING ARRESTORS | 58-R3 | 0 | 6,193,610 | 0 | 0 | 0 | 0.00 | 44.5 | 3,984,825 | - | - |
| L06. | LINE COUPLING EQUIPMENT | 24-R5 | 0 | 11,226 | 0 | 0 | 0 | 0.00 | 0.0 | 0 | - | - |
| M01. | MAIN BREAKERS | 42-R0.5 | (8) | 552,940 | 0 | 44,235 | 1,395 | 0.26 | 33.2 | 288,042 | 0.48 | 0.66 |
| M02. | MARINE TERMINAL | 65-R4 | (6) | 3,833,871 | 0 | 230,032 | 3,681 | 0.10 | 62.5 | 860,754 | 0.43 | 0.66 |
| M03. | METALCLAD SWITCHGEAR CUB/EQU 4kv/600 | 45-R4 | (6) | 2,233,645 | 0 | 134,019 | 5,817 | 0.26 | 31.5 | 669,662 | 0.87 | 0.94 |
| M04. | METER TEST SWITCHES | 35-R5 | 0 | 58,301 | 0 | 0 | 0 | 0.00 | 11.6 | 13,519 | - | - |
| M05. | METERING TANKS | 37-R3 | 0 | 660,416 | 0 | 0 | 0 | 0.00 | 29.2 | 438,378 | - | - |
| M06. | METERS - DIGITAL | 20-L3 | 0 | 5,874,668 | 0 | 0 | 0 | 0.00 | 12.9 | 4,566,868 | - | - |
| M07. | METERS - ANALOGUE | 25-L2 | 0 | 698,384 | 0 | 0 | 0 | 0.00 | 9.1 | 76,225 | - | - |
| M08. | METERS - OTHER | 22-L4 | 0 | 262,853 | 0 | 0 | 0 | 0.00 | 11.4 | 166,747 | - | - |
| M10. | MISCELLANEOUS UNITS OF PROPERTY | 22-R1.5 | 0 | 25,815,956 | 0 | 0 | 0 | 0.00 | 17.7 | 24,143,424 | - | - |

NEWFOUNDLAND AND LABRADOR HYDRO
TABLE 1B. ESTIMATED SURVIVOR CURVES,ORIGINAL AND DEEMED COST AND ANNUAL ACCRUALS
RELATED TO PLANT IN SERVICE AS OF DECEMBER 31, 2015
COST OF REMOVAL

| ACCOUNT | ACCOUNT DESCRIPTION | SURVIVOR CURVE | NET SALVAGE PERCENTAGE | ORIGINAL COST DECEMBER 31, 2015 | BOOK DEPRECIATION RESERVE | FUTURE ACCRUALS | ACCRUAL AMOUNT | ORIGINAL COST ACCRUAL RATE | COMPOSITE REMAINING LIFE | DEEMED COST DECEMBER 31, 2015 | DEEMED COST ACCRUAL RATE | WHOLE LIFE ACCRUAL RATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M11. | MOBILE - A.T.V.'S AND SNOWMOBILES | 6-L3 | 0 | 1,906,739 | 0 | 0 | 0 | 0.00 | 4.0 | 1,630,167 | - | - |
| M12. | MOBILE - AIR COMPRESSOR ATTACHMENT AND BOAT | 20-L0 | 0 | 432,046 | 0 | 0 | 0 | 0.00 | 17.3 | 131,898 | - | - |
| M13. | MOBILE - ARGO'S | 9-R5 | 0 | 287,287 | 0 | 0 | 0 | 0.00 | 0.0 | 180,781 | - | - |
| M14. | MOBILE - FLEX/FORK/LOAD/GRADE/MUSK/TRAILER | 18-L3 | 0 | 10,581,312 | 0 | 0 | 0 | 0.00 | 13.5 | 7,185,044 | - | - |
| M16. | MULTIPLEX EQUIPMENT | 18-S1.5 | 0 | 2,812,217 | 0 | 0 | 0 | 0.00 | 11.3 | 822,074 | - | - |
| O01. | OFFICE EQUIPMENT | 20-SQ | 0 | 1,286,440 | 0 | 0 | 0 | 0.00 | 15.0 | 731,009 | - | - |
| O02. | OFFICE FURNITURE | 20-SQ | 0 | 1,477,990 | 0 | 0 | 0 | 0.00 | 13.5 | 743,513 | - | - |
| P01. | P.C.B. STORAGE CONTAINER | 30-R4 | 0 | 42,480 | 0 | 0 | 0 | 0.00 | 7.7 | 1,483 | - | - |
| P02. | PABX - PRIVATE AUTO BRANCH EXCHANGE | 20-R4 | 0 | 1,181,009 | 0 | 0 | 0 | 0.00 | 10.6 | 277,879 | - | - |
| P03. | PENSTOCK | 70-R4 | (8) | 58,908,421 | 0 | 4,712,674 | 145,974 | 0.25 | 33.4 | 44,875,320 | 0.33 | 0.23 |
| P04. | POLE CRIBS AND POLE HARDWARE | 35-S2.5 | (20) | 118,371,156 | 0 | 23,674,231 | 1,142,374 | 0.96 | 24.0 | 82,813,901 | 1.38 | 1.10 |
| P05. | POLE STRUCTURES - WOOD | 57-R3 | (20) | 129,790,285 | 0 | 25,958,057 | 771,662 | 0.59 | 36.3 | 89,077,051 | 0.87 | 0.72 |
| P06. | POLES - CONCRETE | 25-R4 | (20) | 333,760 | 0 | 66,752 | 29,693 | 8.90 | 3.0 | 55,346 | 53.65 | 1.49 |
| P07. | POLES - WOOD | 43-R1 | (20) | 72,604,630 | 0 | 14,520,926 | 464,761 | 0.64 | 32.2 | 49,437,902 | 0.94 | 1.52 |
| P08. | POWER LINE CARRIER | 25-R3 | (6) | 4,971,572 | 0 | 298,294 | 23,858 | 0.48 | 14.6 | 798,185 | 2.99 | 0.46 |
| P09. | POWER SYSTEMS | 20-L3 | (6) | 664,592 | 0 | 39,876 | 4,300 | 0.64 | 10.0 | 457,452 | 0.94 | 0.57 |
| P10. | POWERHOUSE | 75-R3 | (8) | 93,718,745 | 0 | 7,497,499 | 169,522 | 0.18 | 45.2 | 77,547,345 | 0.22 | 0.24 |
| P11. | PRINTERS | 6-SQ | 0 | 1,038,001 | 0 | 0 | 0 | 0.00 | 4.4 | 968,970 | - | - |
| P12. | PROTECTIVE CONTROL AND RELAY PANELS | 35-R3 | 0 | 9,507,129 | 0 | 0 | 0 | 0.00 | 29.1 | 7,232,549 | - | - |
| R01. | RADIO TOWERS (WOOD OR STEEL) | 48-R3 | (14) | 9,759,106 | 0 | 1,366,275 | 37,759 | 0.39 | 37.0 | 3,006,850 | 1.26 | 0.61 |
| R02. | RADIOS - FIXED MICROWAVE EQUIPMENT | 19-R5 | 0 | 6,212,764 | 0 | 0 | 0 | 0.00 | 9.8 | 1,854,531 | - | - |
| R03. | RADIOS - FIXED UHF EQUIPMENT | 15-L0.5 | 0 | 101,662 | 0 | 0 | 0 | 0.00 | 10.6 | 81,822 | - | - |
| R04. | RADIOS - FIXED VHF EQUIPMENT | 19-R3 | 0 | 560,166 | 0 | 0 | 0 | 0.00 | 10.9 | 153,938 | - | - |
| R05. | RADIOS - MOBILE VHF BASE STATION | 15-R4 | 0 | 7,278,664 | 0 | 0 | 0 | 0.00 | 7.0 | 3,124,097 | - | - |
| R06. | RAMPS - YARD STORAGE | 25-R3 | 0 | 1,593,558 | 0 | 0 | 0 | 0.00 | 16.8 | 935,272 | - | - |
| R07. | REACTORS AND RESISTORS | 40-S4 | 0 | 1,225,065 | 0 | 0 | 0 | 0.00 | 21.4 | 903,491 | - | - |
| R08. | RECLOSERS | 48-R3 | (8) | 7,158,607 | 0 | 572,689 | 18,065 | 0.25 | 38.1 | 4,572,762 | 0.40 | 0.36 |
| R09. | REGULATORS | 40-S0.5 | (8) | 5,667,640 | 0 | 453,411 | 18,933 | 0.33 | 29.3 | 3,706,121 | 0.51 | 0.53 |
| R11. | REVENUE METERING | 35-R3 | 0 | 1,242,916 | 0 | 0 | 0 | 0.00 | 20.9 | 849,542 | - | - |
| R12. | RIGHT-OF-WAYS | 65-R4 | 0 | 21,729,649 | 0 | 0 | 0 | 0.00 | 38.4 | 12,488,097 | - | - |
| R13. | ROADS | 60-R4 | (8) | 84,440,747 | 0 | 6,755,260 | 223,049 | 0.26 | 30.5 | 75,174,354 | 0.30 | 0.27 |
| R14. | ROUTERS AND LAN | 5-SQ | 0 | 2,730,978 | 0 | 0 | 0 | 0.00 | 4.1 | 2,448,737 | - | - |
| R15. | RUNNER | 55-R5 | 0 | 11,669,844 | 0 | 0 | 0 | 0.00 | 12.7 | 6,821,838 | - | - |
| S01. | SCADA EQUIPMENT | 20-L3 | 0 | 4,929,933 | 0 | 0 | 0 | 0.00 | 13.6 | 2,481,772 | - | - |
| S02. | SECTIONALIZERS | 25-R5 | 0 | 154,009 | 0 | 0 | 0 | 0.00 | 4.0 | 45,666 | - | - |
| S03. | SERVERS | 7-SQ | 0 | 3,019,204 | 0 | 0 | 0 | 0.00 | 5.6 | 1,643,300 | - | - |
| S04. | SEWAGE DISPOSAL SYSTEM | 55-R4 | (6) | 2,919,319 | 0 | 175,159 | 4,593 | 0.15 | 41.4 | 1,121,167 | 0.41 | 0.19 |
| S05. | SOFTWARE | 7-SQ | 0 | 10,081,799 | 0 | 0 | 0 | 0.00 | 3.4 | 8,980,374 | - | - |
| S06. | SPILLWAY STRUCTURES | 110-R4 | (8) | 28,120,270 | 0 | 2,249,621 | 30,004 | 0.10 | 75.2 | 26,004,636 | 0.12 | 0.15 |
| S07. | STACKS | 55-R4 | (8) | 7,850,850 | 0 | 628,068 | 16,058 | 0.20 | 48.2 | 4,868,525 | 0.33 | 0.29 |
| S08. | STATIC EXCITATION SYSTEM | 32-R4 | (6) | 8,333,065 | 0 | 499,984 | 167,515 | 2.01 | 6.5 | 5,117,789 | 3.27 | 0.33 |
| S09. | STATIC EXCITATION - TRANSFORMERS | 45-R4 | (6) | 734,327 | 0 | 44,059 | 2,827 | 0.38 | 15.7 | 16,538 | 17.09 | 0.64 |
| S10. | STATION SERVICE | 50-R4 | (6) | 5,233,336 | 0 | 314,000 | 14,642 | 0.28 | 28.1 | 3,966,436 | 0.37 | 0.41 |
| S11. | STOP LOGS | 65-R4 | 0 | 3,114,097 | 0 | 0 | 0 | 0.00 | 34.2 | 2,650,931 | - | - |
| S12. | STORAGE PALLETS AND RACKINGS | 30-R3 | 0 | 14,403 | 0 | 0 | 0 | 0.00 | 0.0 | 0 | - | - |
| S13. | STORM AND YARD DRAINAGE | 55-R4 | 0 | 1,308,713 | 0 | 0 | 0 | 0.00 | 38.8 | 283,067 | - | - |
| S14. | STREET LIGHTS | 20-R2 | (6) | 3,874,989 | 0 | 232,500 | 23,891 | 0.62 | 12.5 | 2,805,557 | 0.85 | 0.68 |
| S15. | STRUCTURAL SUPPORTS (WOOD OR STEEL) | 55-R4 | (6) | 11,677,609 | 0 | 700,657 | 25,273 | 0.22 | 35.4 | 6,251,538 | 0.40 | 0.39 |
| S17. | SUMP SYSTEMS | 35-R4 | 0 | 667,245 | 0 | 0 | 0 | 0.00 | 17.9 | 561,992 | - | - |
| S18. | SURGE SYSTEMS | 60-R4 | 0 | 6,972,889 | 0 | 0 | 0 | 0.00 | 37.5 | 4,069,890 | - | - |
| S19. | STATION SWITCHING | 38-S0.5 | 0 | 11,650,032 | 0 | 0 | 0 | 0.00 | 25.9 | 7,525,863 | - | - |
| S20. | SWITCHING SYSTEMS - L.V. | 60-R5 | 0 | 2,304,609 | 0 | 0 | 0 | 0.00 | 31.8 | 2,071,699 | - | - |
| T01. | TELECONTROL SYSTEM | 25-L1.5 | 0 | 12,429,279 | 0 | 0 | 0 | 0.00 | 18.4 | 6,362,279 | - | - |
| T02. | TEST EQUIPMENT | 20-SQ | 0 | 1,955,314 | 0 | 0 | 0 | 0.00 | 14.8 | 955,358 | - | - |
| T03. | TOOLS AND EQUIPMENT | 20-SQ | 0 | 11,434,328 | 0 | 0 | 0 | 0.00 | 14.3 | 6,366,862 | - | - |
| T04. | TOWERS | 65-R4 | (20) | 77,739,424 | 0 | 15,547,885 | 432,964 | 0.55 | 38.9 | 54,042,115 | 0.80 | 0.67 |
| T05. | TRANSFORMERS - OTHER | 55-R3 | (6) | 89,255,274 | 0 | 5,355,317 | 201,653 | 0.23 | 31.8 | 55,908,373 | 0.36 | 0.41 |
| T06. | TRANSFORMERS - PAD MOUNT | 40-R1.5 | (8) | 17,723,652 | 0 | 1,417,893 | 40,372 | 0.23 | 36.8 | 16,335,856 | 0.25 | 0.31 |
| T07. | TRANSFORMERS - POLE MOUNTED | 30-L1 | (8) | 37,040,457 | 0 | 2,963,236 | 136,116 | 0.37 | 22.9 | 29,543,794 | 0.46 | 0.47 |
| T09. | TURBINES | 55-R2.5 | (14) | 65,159,636 | 0 | 9,122,349 | 333,332 | 0.52 | 29.9 | 42,271,663 | 0.79 | 0.80 |

NEWFOUNDLAND AND LABRADOR HYDRO
TABLE 1B. ESTIMATED SURVIVOR CURVES,ORIGINAL AND DEEMED COST AND ANNUAL ACCRUALS
RELATED TO PLANT IN SERVICE AS OF DECEMBER 31, 2015
COST OF REMOVAL

| ACCOUNT | ACCOUNT DESCRIPTION | SURVIVOR CURVE | NET SALVAGE PERCENTAGE | ORIGINAL COST DECEMBER 31, 2015 | BOOK DEPRECIATION RESERVE | FUTURE ACCRUALS | ACCRUAL AMOUNT | ORIGINAL COST ACCRUAL RATE | COMPOSITE REMAINING LIFE | DEEMED COST DECEMBER 31, 2015 | DEEMED COST ACCRUAL RATE | WHOLE LIFE ACCRUAL RATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T10. | HOLYROOD GAS TURBINE - COMBUSTOR OVERHAUL | 3-SQ | 0 | 2,206,062 | 0 | 0 | 0 | 0.00 | 2.5 | 2,206,062 | - | - |
| T11. | HOLYROOD GAS TURBINE - TURBINE OVERHAUL | 6-SQ | 0 | 2,206,062 | 0 | 0 | 0 | 0.00 | 5.5 | 2,206,062 | - | - |
| T12. | HOLYROOD GAS TURBINE - COMPRESSOR OVERHAUL | 12-SQ | 0 | 3,088,487 | 0 | 0 | 0 | 0.00 | 11.5 | 3,088,487 | - | - |
| V01. | VACUUM CLEANING SYSTEM | 60-R4 | 0 | 72,451 | 0 | 0 | 0 | 0.00 | 25.8 | 6,099 | - | - |
| V02. | VALVES - PENSTOCK | 65-R3 | (8) | 7,567,760 | 0 | 605,421 | 16,573 | 0.21 | 40.1 | 5,558,323 | 0.30 | 0.27 |
| V03. | VEHICLES - 1 TON | 8-L4 | 0 | 51,648 | 0 | 0 | 0 | 0.00 | 5.5 | 51,648 | - | - |
| V04. | VEHICLES - 3/4 TON AND UNDER | 7-L3 | 0 | 5,167,170 | 0 | 0 | 0 | 0.00 | 5.6 | 4,033,711 | - | - |
| V05. | VEHICLES - BOOMS/BODIES/CRANES/CAB/CHASSIS | 12-L3 | 0 | 14,954,546 | 0 | 0 | 0 | 0.00 | 8.1 | 10,855,821 | - | - |
| V06. | VEHICLES - CARS, STATION WAGONS AND VAN | 6-L3 | 0 | 1,795,372 | 0 | 0 | 0 | 0.00 | 4.5 | 1,134,905 | - | - |
| V07. | VEHICLES - DUMP TRUCKS | 10-L5 | 0 | 11,535 | 0 | 0 | 0 | 0.00 | 0.0 | 0 | - | - |
| W01. | WATER REGULATING STRUCTURES | 65-S4 | (8) | 22,451,738 | 0 | 1,796,139 | 47,213 | 0.21 | 41.3 | 18,454,117 | 0.26 | 0.24 |
| W02. | WATER SUPPLY SYSTEMS | 30-L4 | (8) | 3,394,554 | 0 | 271,564 | 28,124 | 0.83 | 14.0 | 1,972,019 | 1.43 | 0.53 |
| W03. | WATER SYSTEMS - FEED | 55-R2.5 | (8) | 6,531,260 | 0 | 522,501 | 18,729 | 0.29 | 37.0 | 3,023,065 | 0.62 | 0.36 |
| W04. | WATER TREATMENT | 55-R2.5 | (6) | 11,921,573 | 0 | 715,295 | 18,997 | 0.16 | 40.3 | 6,307,665 | 0.30 | 0.24 |
| | Sub-Total | | | 2,458,776,655 | 0 | 217,605,468 | 7,038,181 | 0.29 | | 1,756,107,129 | 0.40 | |

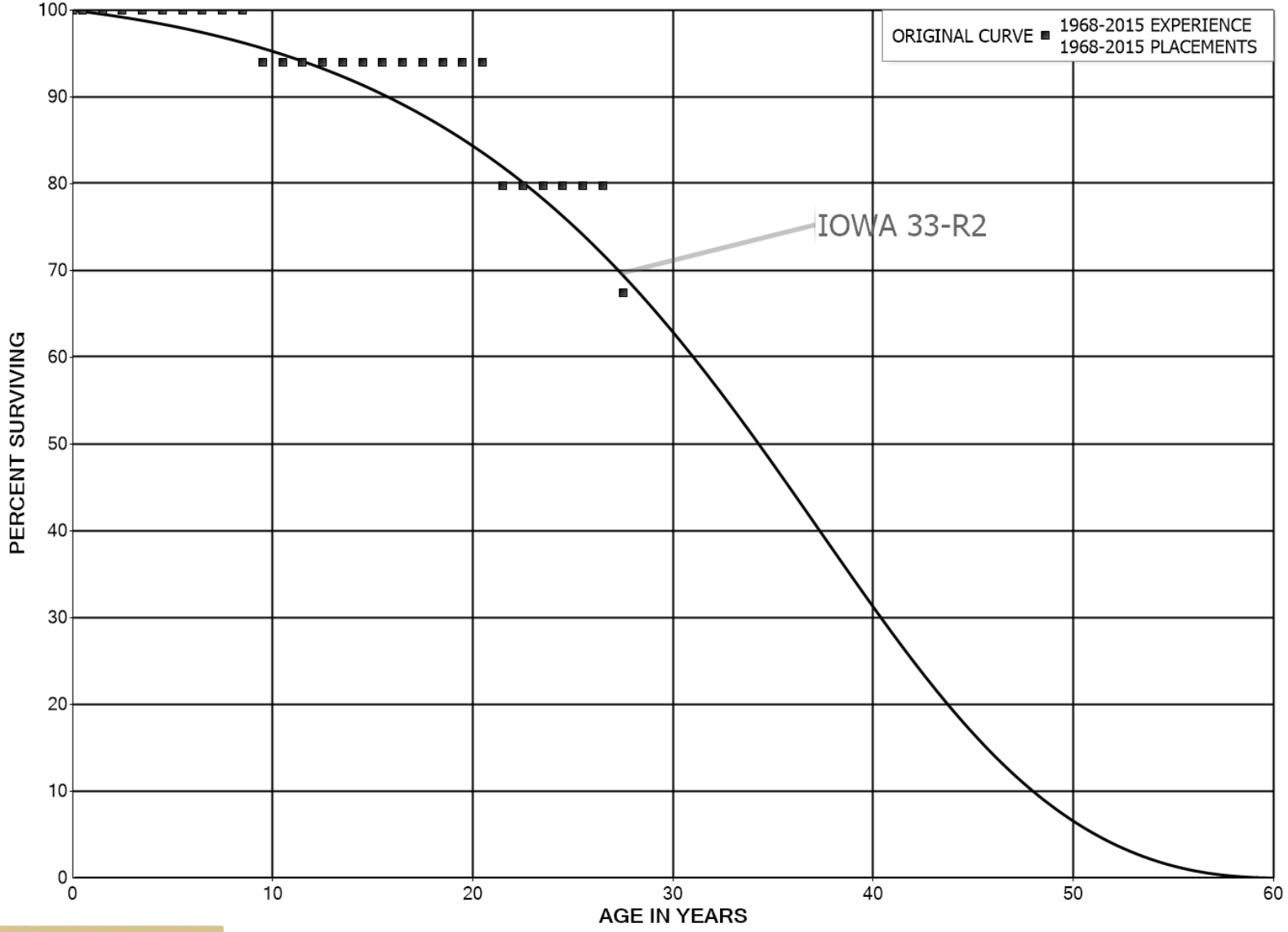
# NEWFOUNDLAND AND LABRADOR HYDRO
# DEPRECIATION STUDY

NEWFOUNDLAND AND LABRADOR HYDRO
TABLE 1B. ESTIMATED SURVIVOR CURVES,ORIGINAL AND DEEMED COST AND ANNUAL ACCRUALS
RELATED TO PLANT IN SERVICE AS OF DECEMBER 31, 2015
COST OF REMOVAL

| ACCOUNT | ACCOUNT DESCRIPTION | SURVIVOR CURVE | NET SALVAGE PERCENTAGE | ORIGINAL COST DECEMBER 31, 2015 | BOOK DEPRECIATION RESERVE | FUTURE ACCRUALS | ACCRUAL AMOUNT | ORIGINAL COST ACCRUAL RATE | COMPOSITE REMAINING LIFE | DEEMED COST DECEMBER 31, 2015 | DEEMED COST ACCRUAL RATE | WHOLE LIFE ACCRUAL RATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HOLYROOD ASSETS** | **TRUCATION DATE** | **3/31/2021** | | | | | | | | | | |
| A04.1 | AUXILIARY POWER SYSTEMS | 30-R4 | (3) | 620,866 | 0 | 18,626 | 3,555 | 0.58 | 5.2 | 492,554 | 0.72 | 1.21 |
| B01.1 | BATTERY AND POWER SYSTEMS | 26-L1.5 | (3) | 106,627 | 0 | 3,199 | 764 | 0.72 | 4.4 | 86,099 | 0.89 | 1.22 |
| B02.1 | BOILER SYSTEM | 40-R3 | (8) | 35,073,430 | 0 | 2,805,875 | 576,238 | 1.64 | 5.0 | 12,295,071 | 4.69 | 3.65 |
| B05.1 | BUILDINGS - OTHER | 50-R0.5 | (3) | 1,300,250 | 0 | 39,007 | 7,601 | 0.58 | 5.1 | 859,162 | 0.88 | 1.26 |
| B06.1 | BUILDINGS - METAL | 55-R3 | (3) | 72,011 | 0 | 2,160 | 412 | 0.57 | 5.2 | 51,935 | 0.79 | 1.22 |
| C01.1 | CABLES - TELECONTROL | 30-R4 | (3) | 89,750 | 0 | 2,692 | 518 | 0.57 | 5.2 | 42,606 | 1.22 | 1.21 |
| C03.1 | CABLES - UNDERGROUND | 60-S4 | (14) | 544,049 | 0 | 76,167 | 14,647 | 2.69 | 5.2 | 68,519 | 21.38 | 6.08 |
| C04.1 | CABLES - ABOVE GROUND | 60-R4 | (14) | 629,827 | 0 | 88,176 | 17,089 | 2.71 | 5.2 | 78,084 | 21.89 | 6.08 |
| C07.1 | CHEMICAL FEED SYSTEMS | 45-R4 | (6) | 77,164 | 0 | 4,630 | 893 | 1.16 | 5.2 | 16,813 | 5.31 | 2.43 |
| C12.1 | CONDENSERS | 55-R3 | (3) | 2,329,667 | 0 | 69,890 | 13,684 | 0.58 | 5.1 | 386,962 | 3.54 | 1.22 |
| C15.1 | CONTROL, METERING, RELAYING | 40-R3 | 0 | 119,880 | 0 | 0 | 0 | 0.00 | 5.2 | 115,036 | - | - |
| E03.1 | ENVIRONMENTAL EQUIPMENT | 45-R2.5 | 0 | 1,280,261 | 0 | 0 | 0 | 0.00 | 5.2 | 624,419 | - | - |
| F03.1 | FIRE FIGHTING EQUIPMENT | 50-R4 | 0 | 797,150 | 0 | 0 | 0 | 0.00 | 5.1 | 290,151 | - | - |
| F04.1 | FOOTINGS AND FOUNDATIONS | 65-R3 | (8) | 56,613 | 0 | 4,529 | 873 | 1.54 | 5.2 | 10,668 | 8.18 | 3.65 |
| F06.1 | FUEL SYSTEMS | 50-R1.5 | (11) | 13,309,152 | 0 | 1,464,007 | 285,329 | 2.14 | 5.2 | 8,233,153 | 3.47 | 4.94 |
| G01.1 | GAS TURBINE SYSTEMS | 45-R3 | (2) | 24,645 | 0 | 493 | 98 | 0.40 | 5.0 | 887 | 11.05 | 0.73 |
| G03.1 | GENERATORS | 65-S3 | (8) | 1,067,438 | 0 | 85,395 | 16,264 | 1.53 | 5.3 | 1,228,857 | 1.32 | 3.65 |
| G06.1 | GOVENORS | 45-S4 | (14) | 2,144,383 | 0 | 300,214 | 57,784 | 2.69 | 5.2 | 773,352 | 7.47 | 6.08 |
| I02.1 | INSTRUMENTATION | 30-L0.5 | 0 | 6,727,326 | 0 | 0 | 0 | 0.00 | 4.8 | 2,327,089 | - | - |
| I05.1 | INVERTERS | 25-S1.5 | (8) | 24,417 | 0 | 1,953 | 405 | 1.66 | 4.8 | 10,794 | 3.75 | 3.66 |
| L03.1 | LAND IMPROVEMENTS | 75-R3 | 0 | 5,766 | 0 | 0 | 0 | 0.00 | 5.2 | 1,281 | - | - |
| M02.1 | MARINE TERMINAL | 65-R4 | (6) | 468,523 | 0 | 28,111 | 5,363 | 1.14 | 5.2 | 175,342 | 3.06 | 2.43 |
| M10.1 | MISCELLANEOUS UNITS OF PROPERTY | 22-R1.5 | 0 | 1,611,947 | 0 | 0 | 0 | 0.00 | 5.1 | 1,583,560 | - | - |
| O02.1 | OFFICE FURNITURE | 20-SQ | 0 | 58,975 | 0 | 0 | 0 | 0.00 | 2.5 | 16,483 | - | - |
| P10.1 | POWERHOUSE | 75-R3 | (8) | 8,903,432 | 0 | 712,275 | 137,239 | 1.54 | 5.2 | 1,133,208 | 12.11 | 3.65 |
| P12.1 | PROTECTIVE CONTROL AND RELAY PANELS | 35-R3 | 0 | 106,685 | 0 | 0 | 0 | 0.00 | 5.2 | 65,847 | - | - |
| R13.1 | ROADS | 60-R4 | (8) | 1,859 | 0 | 149 | 29 | 1.56 | 5.2 | 248 | 11.70 | 3.65 |
| S07.1 | STACKS | 55-R4 | (8) | 9,202,119 | 0 | 736,169 | 144,478 | 1.57 | 5.2 | 4,786,711 | 3.02 | 3.65 |
| S08.1 | STATIC EXCITATION SYSTEM | 32-R4 | (6) | 1,461,435 | 0 | 87,686 | 70,971 | 4.86 | 1.4 | 729,359 | 9.73 | 2.43 |
| T03.1 | TOOLS AND EQUIPMENT | 20-SQ | 0 | 351,262 | 0 | 0 | 0 | 0.00 | 5.2 | 268,073 | - | - |
| T05.1 | TRANSFORMERS | 55-R3 | (6) | 126,690 | 0 | 7,602 | 1,451 | 1.14 | 5.2 | 126,690 | 1.15 | 2.43 |
| T09.1 | TURBINES | 55-R2.5 | (14) | 27,077,372 | 0 | 3,790,832 | 730,053 | 2.70 | 5.2 | 20,041,663 | 3.64 | 6.11 |
| W03.1 | WATER SYSTEMS - FEED | 55-R2.5 | (8) | 2,818,634 | 0 | 225,491 | 44,198 | 1.57 | 5.1 | 1,270,349 | 3.48 | 3.66 |
| W04.1 | WATER TREATMENT | 55-R2.5 | (6) | 2,792,962 | 0 | 167,578 | 32,417 | 1.16 | 5.2 | 1,772,842 | 1.83 | 2.44 |
| | Sub-Total | | | 121,382,565 | 0 | 10,722,906 | 2,162,353 | 1.78 | | 59,963,868 | 3.61 | |
| | TOTAL | | | 2,580,159,221 | 0 | 228,328,374 | 9,200,534 | 0.36 | | 1,816,070,997 | 0.51 | |

# PART V. SERVICE LIFE STATISTICS

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT A01 - AIRCRAFT LANDING STRIP
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT A01 - AIRCRAFT LANDING STRIP

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 583,066 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 580,763 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 580,763 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 580,763 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 580,763 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 580,763 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 580,763 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 580,763 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 580,763 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 580,763 | 35,373 | 0.0609 | 0.9391 | 100.00 |
| 9.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 10.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 11.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 12.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 13.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 14.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 15.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 16.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 17.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 18.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 19.5 | 467,000 | | 0.0000 | 1.0000 | 93.91 |
| 20.5 | 467,000 | 70,746 | 0.1515 | 0.8485 | 93.91 |
| 21.5 | 201,633 | | 0.0000 | 1.0000 | 79.68 |
| 22.5 | 9,425 | | 0.0000 | 1.0000 | 79.68 |
| 23.5 | 9,425 | | 0.0000 | 1.0000 | 79.68 |
| 24.5 | 9,425 | | 0.0000 | 1.0000 | 79.68 |
| 25.5 | 9,425 | | 0.0000 | 1.0000 | 79.68 |
| 26.5 | 9,425 | 1,449 | 0.1537 | 0.8463 | 79.68 |
| 27.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 28.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 29.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 30.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 31.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 32.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 33.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 34.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 35.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 36.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 37.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 38.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |

NEWFOUNDLAND AND LABRADOR HYDRO

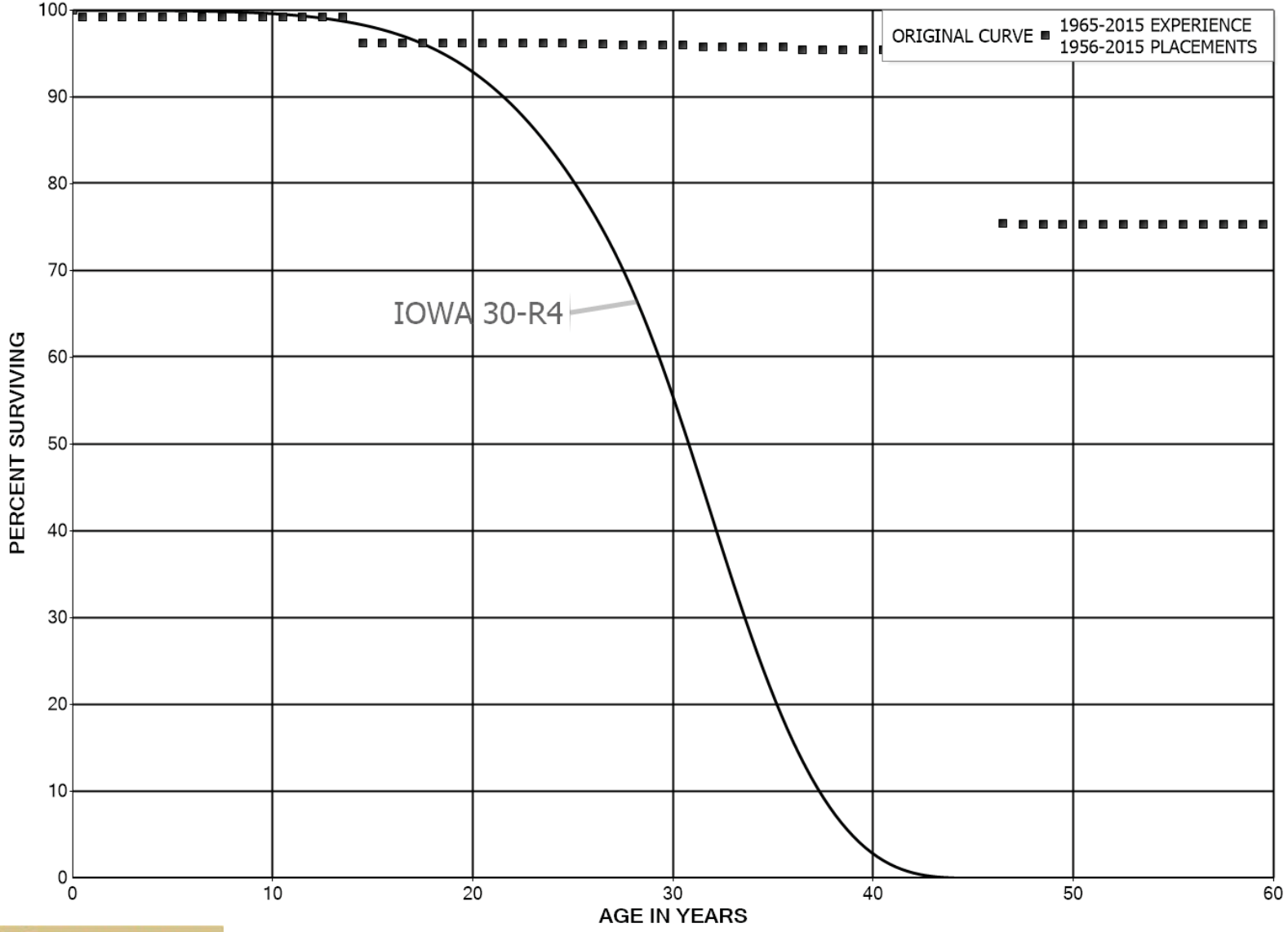
ACCOUNT A01 - AIRCRAFT LANDING STRIP

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 40.5 | 7,976 | | 0.0000 | 1.0000 | 67.43 |
| 41.5 | | | | | 67.43 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT A04 - AUXILIARY POWER SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT A04 - AUXILIARY POWER SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1956-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 6,844,251 | 56,321 | 0.0082 | 0.9918 | 100.00 |
| 0.5 | 5,450,620 | | 0.0000 | 1.0000 | 99.18 |
| 1.5 | 5,450,620 | | 0.0000 | 1.0000 | 99.18 |
| 2.5 | 4,648,143 | | 0.0000 | 1.0000 | 99.18 |
| 3.5 | 4,435,128 | | 0.0000 | 1.0000 | 99.18 |
| 4.5 | 4,375,301 | | 0.0000 | 1.0000 | 99.18 |
| 5.5 | 3,417,839 | | 0.0000 | 1.0000 | 99.18 |
| 6.5 | 3,417,839 | | 0.0000 | 1.0000 | 99.18 |
| 7.5 | 3,417,839 | | 0.0000 | 1.0000 | 99.18 |
| 8.5 | 3,503,309 | | 0.0000 | 1.0000 | 99.18 |
| 9.5 | 3,503,309 | | 0.0000 | 1.0000 | 99.18 |
| 10.5 | 3,405,766 | | 0.0000 | 1.0000 | 99.18 |
| 11.5 | 3,405,766 | | 0.0000 | 1.0000 | 99.18 |
| 12.5 | 2,957,369 | | 0.0000 | 1.0000 | 99.18 |
| 13.5 | 2,957,369 | 88,784 | 0.0300 | 0.9700 | 99.18 |
| 14.5 | 2,500,316 | | 0.0000 | 1.0000 | 96.20 |
| 15.5 | 2,336,231 | | 0.0000 | 1.0000 | 96.20 |
| 16.5 | 2,320,175 | | 0.0000 | 1.0000 | 96.20 |
| 17.5 | 2,320,175 | | 0.0000 | 1.0000 | 96.20 |
| 18.5 | 2,320,175 | | 0.0000 | 1.0000 | 96.20 |
| 19.5 | 2,320,175 | | 0.0000 | 1.0000 | 96.20 |
| 20.5 | 2,320,175 | | 0.0000 | 1.0000 | 96.20 |
| 21.5 | 2,320,175 | | 0.0000 | 1.0000 | 96.20 |
| 22.5 | 2,320,175 | | 0.0000 | 1.0000 | 96.20 |
| 23.5 | 2,256,451 | | 0.0000 | 1.0000 | 96.20 |
| 24.5 | 2,256,451 | 4,435 | 0.0020 | 0.9980 | 96.20 |
| 25.5 | 2,252,016 | | 0.0000 | 1.0000 | 96.01 |
| 26.5 | 1,571,875 | 1,465 | 0.0009 | 0.9991 | 96.01 |
| 27.5 | 1,404,505 | | 0.0000 | 1.0000 | 95.92 |
| 28.5 | 1,404,505 | | 0.0000 | 1.0000 | 95.92 |
| 29.5 | 1,404,505 | | 0.0000 | 1.0000 | 95.92 |
| 30.5 | 1,404,505 | 2,233 | 0.0016 | 0.9984 | 95.92 |
| 31.5 | 1,181,198 | | 0.0000 | 1.0000 | 95.77 |
| 32.5 | 1,137,700 | | 0.0000 | 1.0000 | 95.77 |
| 33.5 | 724,162 | | 0.0000 | 1.0000 | 95.77 |
| 34.5 | 724,162 | | 0.0000 | 1.0000 | 95.77 |
| 35.5 | 588,602 | 2,388 | 0.0041 | 0.9959 | 95.77 |
| 36.5 | 486,440 | | 0.0000 | 1.0000 | 95.38 |
| 37.5 | 484,440 | | 0.0000 | 1.0000 | 95.38 |
| 38.5 | 484,440 | | 0.0000 | 1.0000 | 95.38 |

NEWFOUNDLAND AND LABRADOR HYDRO

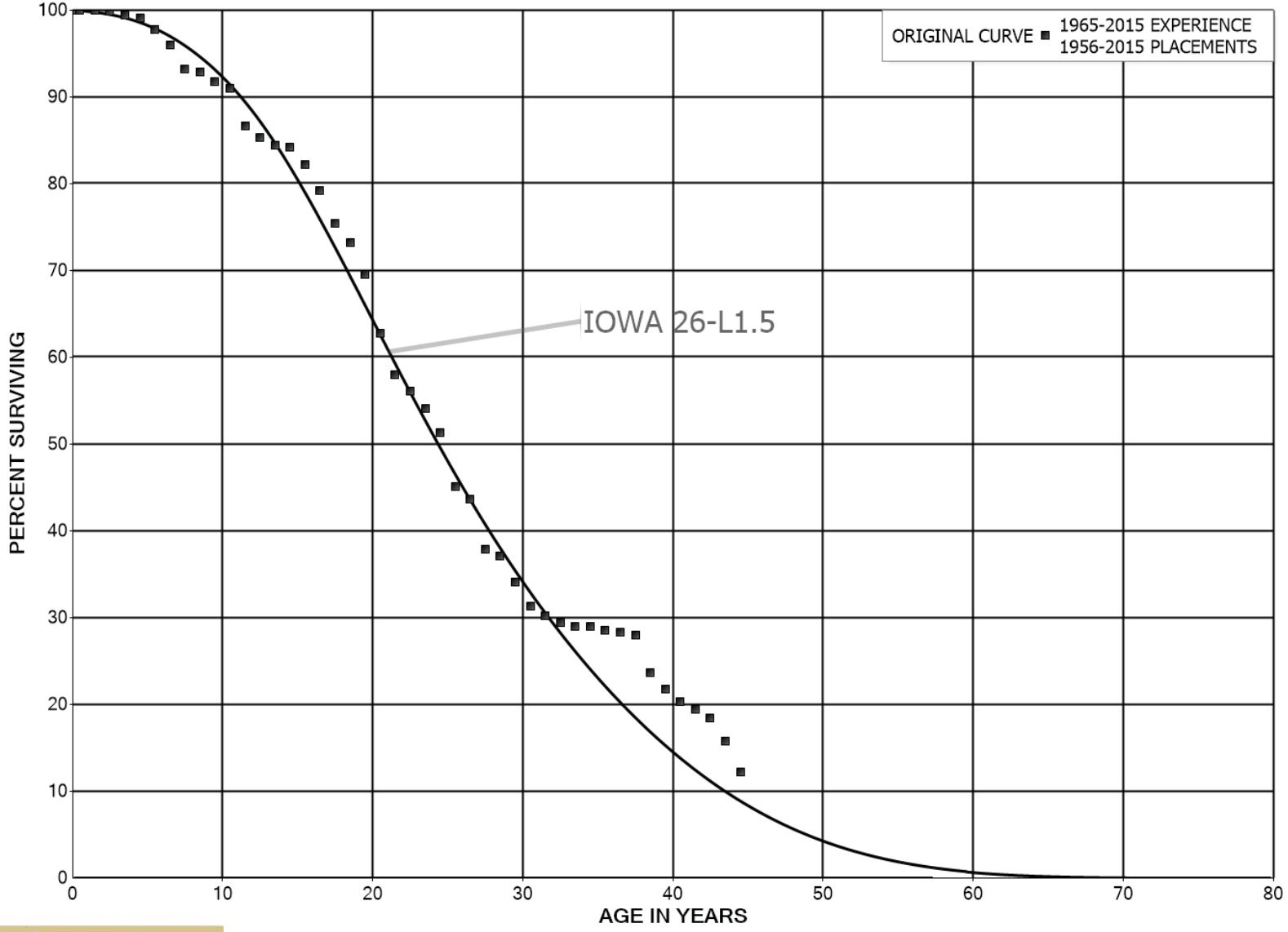
ACCOUNT A04 - AUXILIARY POWER SYSTEMS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1956-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 484,440 | | 0.0000 | 1.0000 | 95.38 |
| 40.5 | 484,440 | | 0.0000 | 1.0000 | 95.38 |
| 41.5 | 479,390 | | 0.0000 | 1.0000 | 95.38 |
| 42.5 | 479,390 | | 0.0000 | 1.0000 | 95.38 |
| 43.5 | 479,390 | | 0.0000 | 1.0000 | 95.38 |
| 44.5 | 479,390 | | 0.0000 | 1.0000 | 95.38 |
| 45.5 | 467,390 | 98,000 | 0.2097 | 0.7903 | 95.38 |
| 46.5 | 369,390 | 289 | 0.0008 | 0.9992 | 75.38 |
| 47.5 | 369,101 | | 0.0000 | 1.0000 | 75.32 |
| 48.5 | 369,101 | | 0.0000 | 1.0000 | 75.32 |
| 49.5 | 85,470 | | 0.0000 | 1.0000 | 75.32 |
| 50.5 | 85,470 | | 0.0000 | 1.0000 | 75.32 |
| 51.5 | 85,470 | | 0.0000 | 1.0000 | 75.32 |
| 52.5 | 85,470 | | 0.0000 | 1.0000 | 75.32 |
| 53.5 | 85,470 | | 0.0000 | 1.0000 | 75.32 |
| 54.5 | 85,470 | | 0.0000 | 1.0000 | 75.32 |
| 55.5 | 85,470 | | 0.0000 | 1.0000 | 75.32 |
| 56.5 | 85,470 | | 0.0000 | 1.0000 | 75.32 |
| 57.5 | 85,470 | | 0.0000 | 1.0000 | 75.32 |
| 58.5 | 85,470 | | 0.0000 | 1.0000 | 75.32 |
| 59.5 | | | | | 75.32 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT B01 - BATTERY AND POWER SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B01 - BATTERY AND POWER SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1956-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 15,741,039 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 14,914,911 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 14,548,815 | 31,712 | 0.0022 | 0.9978 | 100.00 |
| 2.5 | 13,711,017 | 47,671 | 0.0035 | 0.9965 | 99.78 |
| 3.5 | 12,451,002 | 40,274 | 0.0032 | 0.9968 | 99.44 |
| 4.5 | 11,702,891 | 159,679 | 0.0136 | 0.9864 | 99.11 |
| 5.5 | 10,984,190 | 207,966 | 0.0189 | 0.9811 | 97.76 |
| 6.5 | 10,009,380 | 288,121 | 0.0288 | 0.9712 | 95.91 |
| 7.5 | 9,362,565 | 34,448 | 0.0037 | 0.9963 | 93.15 |
| 8.5 | 8,847,535 | 107,713 | 0.0122 | 0.9878 | 92.81 |
| 9.5 | 8,339,058 | 67,934 | 0.0081 | 0.9919 | 91.68 |
| 10.5 | 7,835,000 | 371,208 | 0.0474 | 0.9526 | 90.93 |
| 11.5 | 7,037,952 | 106,152 | 0.0151 | 0.9849 | 86.62 |
| 12.5 | 5,559,047 | 59,727 | 0.0107 | 0.9893 | 85.32 |
| 13.5 | 5,492,709 | 13,768 | 0.0025 | 0.9975 | 84.40 |
| 14.5 | 4,629,876 | 108,926 | 0.0235 | 0.9765 | 84.19 |
| 15.5 | 4,336,216 | 161,634 | 0.0373 | 0.9627 | 82.21 |
| 16.5 | 4,154,340 | 195,177 | 0.0470 | 0.9530 | 79.14 |
| 17.5 | 3,769,965 | 115,058 | 0.0305 | 0.9695 | 75.42 |
| 18.5 | 3,643,147 | 180,715 | 0.0496 | 0.9504 | 73.12 |
| 19.5 | 3,280,050 | 320,349 | 0.0977 | 0.9023 | 69.49 |
| 20.5 | 2,887,798 | 221,046 | 0.0765 | 0.9235 | 62.71 |
| 21.5 | 2,641,652 | 85,451 | 0.0323 | 0.9677 | 57.91 |
| 22.5 | 2,556,201 | 90,249 | 0.0353 | 0.9647 | 56.03 |
| 23.5 | 2,300,838 | 117,643 | 0.0511 | 0.9489 | 54.06 |
| 24.5 | 2,183,195 | 266,372 | 0.1220 | 0.8780 | 51.29 |
| 25.5 | 1,635,643 | 52,049 | 0.0318 | 0.9682 | 45.03 |
| 26.5 | 1,569,780 | 208,599 | 0.1329 | 0.8671 | 43.60 |
| 27.5 | 1,354,635 | 25,667 | 0.0189 | 0.9811 | 37.81 |
| 28.5 | 1,326,794 | 107,122 | 0.0807 | 0.9193 | 37.09 |
| 29.5 | 1,219,672 | 100,855 | 0.0827 | 0.9173 | 34.10 |
| 30.5 | 1,006,195 | 35,619 | 0.0354 | 0.9646 | 31.28 |
| 31.5 | 970,576 | 23,696 | 0.0244 | 0.9756 | 30.17 |
| 32.5 | 946,881 | 17,400 | 0.0184 | 0.9816 | 29.43 |
| 33.5 | 851,124 | | 0.0000 | 1.0000 | 28.89 |
| 34.5 | 851,124 | 10,357 | 0.0122 | 0.9878 | 28.89 |
| 35.5 | 530,788 | 5,270 | 0.0099 | 0.9901 | 28.54 |
| 36.5 | 516,555 | 6,470 | 0.0125 | 0.9875 | 28.26 |
| 37.5 | 470,539 | 72,512 | 0.1541 | 0.8459 | 27.90 |
| 38.5 | 398,027 | 32,393 | 0.0814 | 0.9186 | 23.60 |

NEWFOUNDLAND AND LABRADOR HYDRO

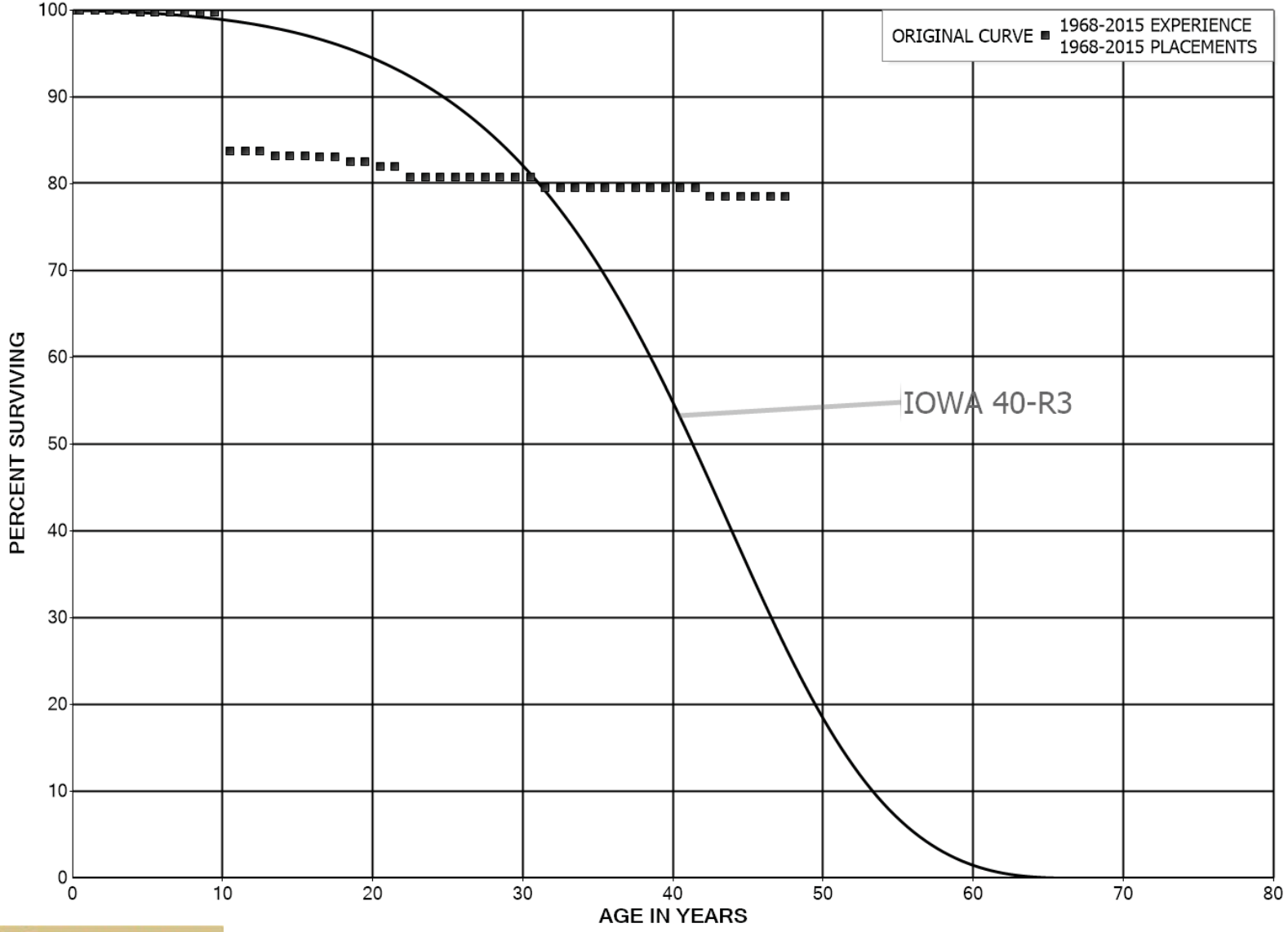
ACCOUNT B01 - BATTERY AND POWER SYSTEMS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1956-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 365,634 | 23,740 | 0.0649 | 0.9351 | 21.68 |
| 40.5 | 335,847 | 13,700 | 0.0408 | 0.9592 | 20.27 |
| 41.5 | 322,147 | 17,094 | 0.0531 | 0.9469 | 19.45 |
| 42.5 | 304,702 | 44,588 | 0.1463 | 0.8537 | 18.42 |
| 43.5 | 242,923 | 55,185 | 0.2272 | 0.7728 | 15.72 |
| 44.5 | 126,300 | | 0.0000 | 1.0000 | 12.15 |
| 45.5 | 122,665 | 12,425 | 0.1013 | 0.8987 | 12.15 |
| 46.5 | 110,240 | | 0.0000 | 1.0000 | 10.92 |
| 47.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 48.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 49.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 50.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 51.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 52.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 53.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 54.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 55.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 56.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 57.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 58.5 | 1,466 | | 0.0000 | 1.0000 | 10.92 |
| 59.5 | | | | | 10.92 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT B02 - BOILER SYSTEM
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B02 - BOILER SYSTEM

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 70,231,168 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 70,137,735 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 69,218,304 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 69,135,617 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 67,758,844 | 180,285 | 0.0027 | 0.9973 | 100.00 |
| 4.5 | 66,863,796 | | 0.0000 | 1.0000 | 99.73 |
| 5.5 | 65,506,295 | | 0.0000 | 1.0000 | 99.73 |
| 6.5 | 64,184,236 | | 0.0000 | 1.0000 | 99.73 |
| 7.5 | 59,966,281 | | 0.0000 | 1.0000 | 99.73 |
| 8.5 | 54,489,872 | | 0.0000 | 1.0000 | 99.73 |
| 9.5 | 54,489,872 | 8,721,695 | 0.1601 | 0.8399 | 99.73 |
| 10.5 | 45,768,177 | | 0.0000 | 1.0000 | 83.77 |
| 11.5 | 45,768,177 | | 0.0000 | 1.0000 | 83.77 |
| 12.5 | 45,768,177 | 328,432 | 0.0072 | 0.9928 | 83.77 |
| 13.5 | 45,439,745 | | 0.0000 | 1.0000 | 83.17 |
| 14.5 | 45,031,090 | | 0.0000 | 1.0000 | 83.17 |
| 15.5 | 45,031,090 | 42,746 | 0.0009 | 0.9991 | 83.17 |
| 16.5 | 44,714,746 | | 0.0000 | 1.0000 | 83.09 |
| 17.5 | 44,714,746 | 292,387 | 0.0065 | 0.9935 | 83.09 |
| 18.5 | 43,412,932 | | 0.0000 | 1.0000 | 82.55 |
| 19.5 | 43,383,798 | 338,428 | 0.0078 | 0.9922 | 82.55 |
| 20.5 | 43,045,370 | | 0.0000 | 1.0000 | 81.90 |
| 21.5 | 43,045,370 | 629,544 | 0.0146 | 0.9854 | 81.90 |
| 22.5 | 42,231,334 | | 0.0000 | 1.0000 | 80.71 |
| 23.5 | 42,066,888 | | 0.0000 | 1.0000 | 80.71 |
| 24.5 | 42,066,888 | | 0.0000 | 1.0000 | 80.71 |
| 25.5 | 42,066,888 | | 0.0000 | 1.0000 | 80.71 |
| 26.5 | 37,715,238 | | 0.0000 | 1.0000 | 80.71 |
| 27.5 | 37,234,903 | | 0.0000 | 1.0000 | 80.71 |
| 28.5 | 37,066,712 | | 0.0000 | 1.0000 | 80.71 |
| 29.5 | 36,922,122 | | 0.0000 | 1.0000 | 80.71 |
| 30.5 | 36,885,398 | 564,681 | 0.0153 | 0.9847 | 80.71 |
| 31.5 | 36,231,939 | | 0.0000 | 1.0000 | 79.47 |
| 32.5 | 34,026,361 | | 0.0000 | 1.0000 | 79.47 |
| 33.5 | 33,958,330 | | 0.0000 | 1.0000 | 79.47 |
| 34.5 | 33,644,077 | | 0.0000 | 1.0000 | 79.47 |
| 35.5 | 15,993,526 | | 0.0000 | 1.0000 | 79.47 |
| 36.5 | 15,971,096 | | 0.0000 | 1.0000 | 79.47 |
| 37.5 | 15,971,096 | | 0.0000 | 1.0000 | 79.47 |
| 38.5 | 15,971,096 | | 0.0000 | 1.0000 | 79.47 |

NEWFOUNDLAND AND LABRADOR HYDRO

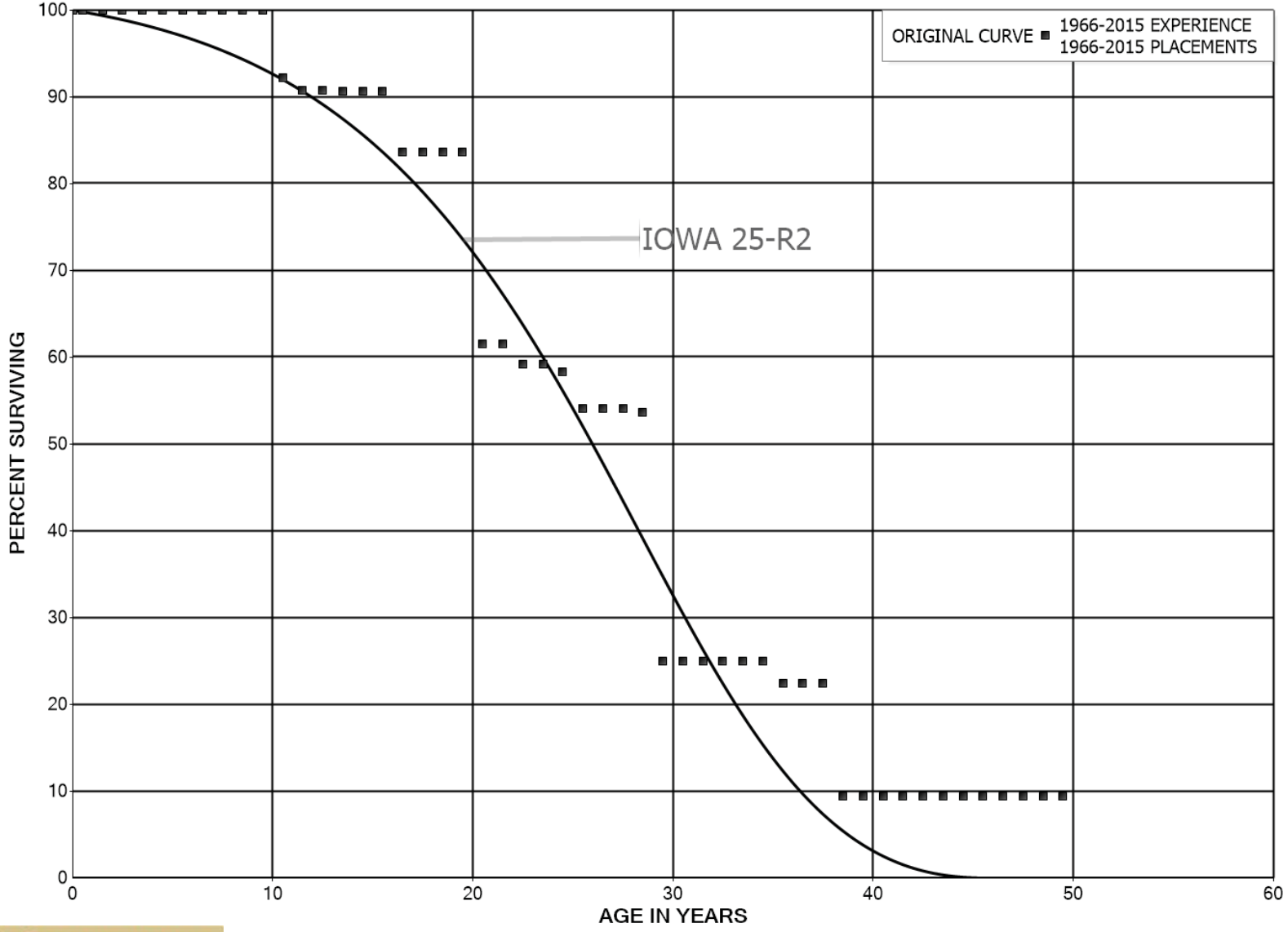
ACCOUNT B02 - BOILER SYSTEM

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 15,964,723 | | 0.0000 | 1.0000 | 79.47 |
| 40.5 | 15,964,723 | | 0.0000 | 1.0000 | 79.47 |
| 41.5 | 15,964,723 | 183,493 | 0.0115 | 0.9885 | 79.47 |
| 42.5 | 15,781,230 | | 0.0000 | 1.0000 | 78.56 |
| 43.5 | 15,781,230 | | 0.0000 | 1.0000 | 78.56 |
| 44.5 | 14,985,641 | | 0.0000 | 1.0000 | 78.56 |
| 45.5 | 14,985,641 | | 0.0000 | 1.0000 | 78.56 |
| 46.5 | 14,985,641 | | 0.0000 | 1.0000 | 78.56 |
| 47.5 | | | | | 78.56 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT B03 - BOOMS - TIMBER
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B03 - BOOMS - TIMBER

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 723,485 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 671,923 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 634,914 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 634,914 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 634,914 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 634,914 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 634,914 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 634,914 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 634,914 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 634,914 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 634,914 | 50,000 | 0.0788 | 0.9212 | 100.00 |
| 10.5 | 584,914 | 8,673 | 0.0148 | 0.9852 | 92.12 |
| 11.5 | 576,242 | | 0.0000 | 1.0000 | 90.76 |
| 12.5 | 576,242 | 818 | 0.0014 | 0.9986 | 90.76 |
| 13.5 | 575,423 | | 0.0000 | 1.0000 | 90.63 |
| 14.5 | 575,423 | | 0.0000 | 1.0000 | 90.63 |
| 15.5 | 575,423 | 44,401 | 0.0772 | 0.9228 | 90.63 |
| 16.5 | 531,022 | | 0.0000 | 1.0000 | 83.64 |
| 17.5 | 531,022 | | 0.0000 | 1.0000 | 83.64 |
| 18.5 | 531,022 | | 0.0000 | 1.0000 | 83.64 |
| 19.5 | 531,022 | 140,269 | 0.2641 | 0.7359 | 83.64 |
| 20.5 | 390,753 | | 0.0000 | 1.0000 | 61.54 |
| 21.5 | 390,753 | 14,962 | 0.0383 | 0.9617 | 61.54 |
| 22.5 | 375,791 | | 0.0000 | 1.0000 | 59.19 |
| 23.5 | 375,791 | 5,428 | 0.0144 | 0.9856 | 59.19 |
| 24.5 | 370,363 | 26,774 | 0.0723 | 0.9277 | 58.33 |
| 25.5 | 343,589 | | 0.0000 | 1.0000 | 54.12 |
| 26.5 | 343,589 | | 0.0000 | 1.0000 | 54.12 |
| 27.5 | 343,589 | 3,034 | 0.0088 | 0.9912 | 54.12 |
| 28.5 | 340,555 | 182,066 | 0.5346 | 0.4654 | 53.64 |
| 29.5 | 158,489 | | 0.0000 | 1.0000 | 24.96 |
| 30.5 | 158,489 | | 0.0000 | 1.0000 | 24.96 |
| 31.5 | 158,489 | | 0.0000 | 1.0000 | 24.96 |
| 32.5 | 158,489 | | 0.0000 | 1.0000 | 24.96 |
| 33.5 | 158,489 | | 0.0000 | 1.0000 | 24.96 |
| 34.5 | 158,489 | 16,064 | 0.1014 | 0.8986 | 24.96 |
| 35.5 | 142,425 | | 0.0000 | 1.0000 | 22.43 |
| 36.5 | 95,631 | | 0.0000 | 1.0000 | 22.43 |
| 37.5 | 95,631 | 55,440 | 0.5797 | 0.4203 | 22.43 |
| 38.5 | 40,191 | | 0.0000 | 1.0000 | 9.43 |

NEWFOUNDLAND AND LABRADOR HYDRO

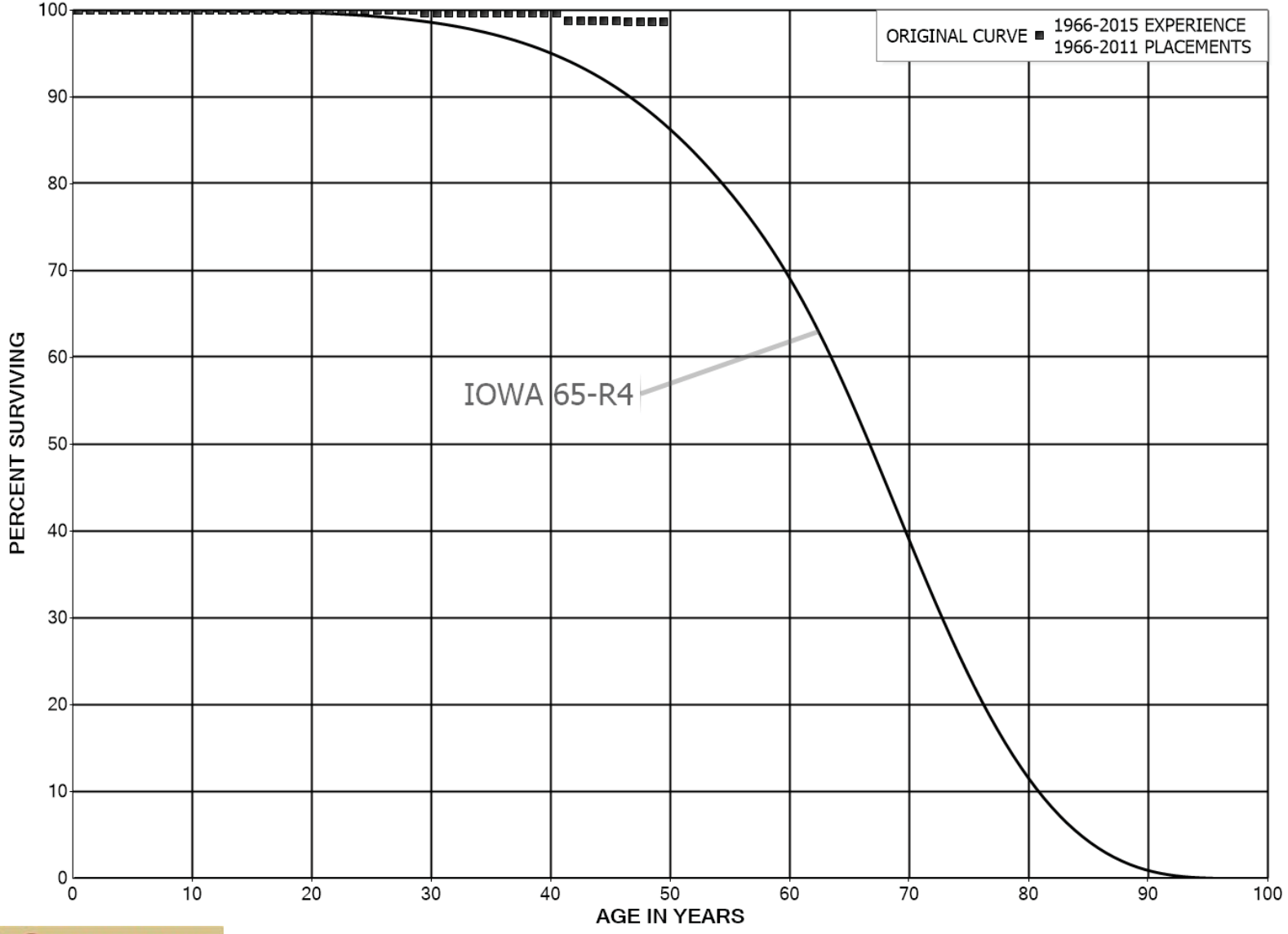
ACCOUNT B03 - BOOMS - TIMBER

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 40,191 | | 0.0000 | 1.0000 | 9.43 |
| 40.5 | 40,191 | | 0.0000 | 1.0000 | 9.43 |
| 41.5 | 40,191 | | 0.0000 | 1.0000 | 9.43 |
| 42.5 | 40,191 | | 0.0000 | 1.0000 | 9.43 |
| 43.5 | 40,191 | | 0.0000 | 1.0000 | 9.43 |
| 44.5 | 40,191 | | 0.0000 | 1.0000 | 9.43 |
| 45.5 | 38,209 | | 0.0000 | 1.0000 | 9.43 |
| 46.5 | 38,209 | | 0.0000 | 1.0000 | 9.43 |
| 47.5 | 38,209 | | 0.0000 | 1.0000 | 9.43 |
| 48.5 | 38,209 | | 0.0000 | 1.0000 | 9.43 |
| 49.5 | | | | | 9.43 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT B04 - BRIDGES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B04 - BRIDGES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2011 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 4,270,789 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 4,270,789 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 4,270,789 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 4,270,789 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 4,270,789 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 4,251,595 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 4,251,595 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 4,251,595 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 4,251,595 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 3,914,583 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 3,914,583 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 3,914,583 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 3,914,583 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 3,602,553 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 3,602,553 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 3,602,553 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 3,602,553 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 3,602,553 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 3,602,553 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 3,538,953 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 3,502,566 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 3,502,566 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 3,447,001 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 3,447,001 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 2,817,693 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 2,817,693 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 2,817,693 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 2,817,693 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 2,817,693 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 2,817,693 | 11,000 | 0.0039 | 0.9961 | 100.00 |
| 29.5 | 2,806,693 | | 0.0000 | 1.0000 | 99.61 |
| 30.5 | 2,806,693 | | 0.0000 | 1.0000 | 99.61 |
| 31.5 | 818,463 | | 0.0000 | 1.0000 | 99.61 |
| 32.5 | 791,716 | | 0.0000 | 1.0000 | 99.61 |
| 33.5 | 791,716 | | 0.0000 | 1.0000 | 99.61 |
| 34.5 | 791,716 | | 0.0000 | 1.0000 | 99.61 |
| 35.5 | 570,290 | | 0.0000 | 1.0000 | 99.61 |
| 36.5 | 570,290 | | 0.0000 | 1.0000 | 99.61 |
| 37.5 | 570,290 | | 0.0000 | 1.0000 | 99.61 |
| 38.5 | 570,290 | | 0.0000 | 1.0000 | 99.61 |

NEWFOUNDLAND AND LABRADOR HYDRO

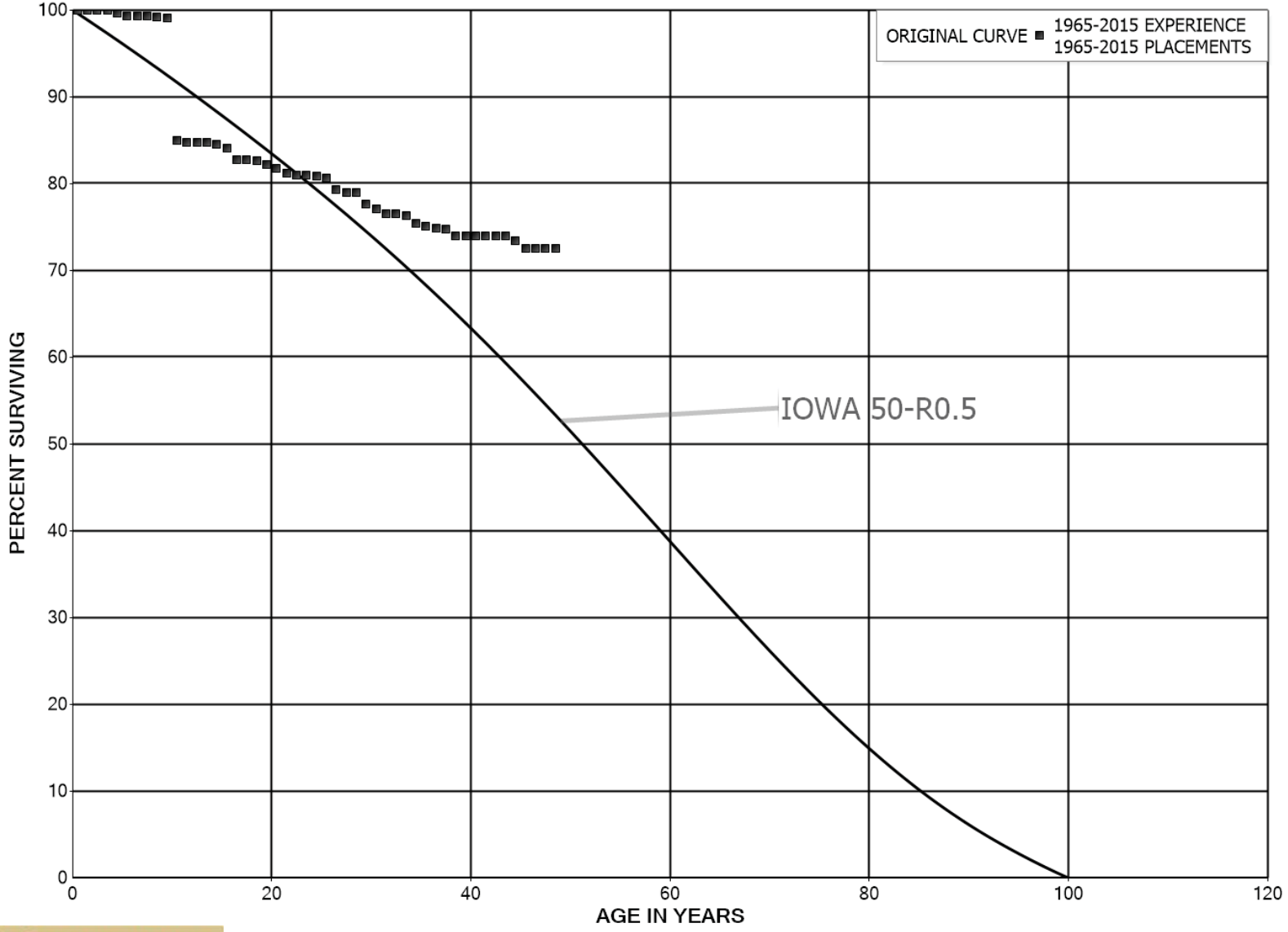
ACCOUNT B04 - BRIDGES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2011 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 570,290 | | 0.0000 | 1.0000 | 99.61 |
| 40.5 | 570,290 | 5,021 | 0.0088 | 0.9912 | 99.61 |
| 41.5 | 565,270 | | 0.0000 | 1.0000 | 98.73 |
| 42.5 | 565,270 | | 0.0000 | 1.0000 | 98.73 |
| 43.5 | 565,270 | | 0.0000 | 1.0000 | 98.73 |
| 44.5 | 565,270 | | 0.0000 | 1.0000 | 98.73 |
| 45.5 | 565,270 | 479 | 0.0008 | 0.9992 | 98.73 |
| 46.5 | 564,791 | | 0.0000 | 1.0000 | 98.65 |
| 47.5 | 564,791 | | 0.0000 | 1.0000 | 98.65 |
| 48.5 | 564,791 | | 0.0000 | 1.0000 | 98.65 |
| 49.5 | | | | | 98.65 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT B05 - BUILDINGS - OTHER
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B05 - BUILDINGS - OTHER

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 81,733,917 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 79,467,544 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 77,165,990 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 75,417,722 | 76,705 | 0.0010 | 0.9990 | 100.00 |
| 3.5 | 73,220,560 | 204,506 | 0.0028 | 0.9972 | 99.90 |
| 4.5 | 69,160,675 | 199,241 | 0.0029 | 0.9971 | 99.62 |
| 5.5 | 62,203,059 | 18,672 | 0.0003 | 0.9997 | 99.33 |
| 6.5 | 61,310,444 | 10,000 | 0.0002 | 0.9998 | 99.30 |
| 7.5 | 60,347,764 | 69,496 | 0.0012 | 0.9988 | 99.29 |
| 8.5 | 59,310,893 | 78,986 | 0.0013 | 0.9987 | 99.17 |
| 9.5 | 54,131,652 | 7,733,707 | 0.1429 | 0.8571 | 99.04 |
| 10.5 | 45,260,382 | 59,708 | 0.0013 | 0.9987 | 84.89 |
| 11.5 | 44,413,636 | | 0.0000 | 1.0000 | 84.78 |
| 12.5 | 40,998,859 | 25,765 | 0.0006 | 0.9994 | 84.78 |
| 13.5 | 40,933,193 | 132,098 | 0.0032 | 0.9968 | 84.72 |
| 14.5 | 38,775,766 | 158,952 | 0.0041 | 0.9959 | 84.45 |
| 15.5 | 38,080,243 | 634,408 | 0.0167 | 0.9833 | 84.11 |
| 16.5 | 37,082,626 | 13,958 | 0.0004 | 0.9996 | 82.70 |
| 17.5 | 37,008,045 | 10,389 | 0.0003 | 0.9997 | 82.67 |
| 18.5 | 36,051,567 | 220,139 | 0.0061 | 0.9939 | 82.65 |
| 19.5 | 34,768,422 | 180,807 | 0.0052 | 0.9948 | 82.15 |
| 20.5 | 34,024,736 | 238,434 | 0.0070 | 0.9930 | 81.72 |
| 21.5 | 33,292,621 | 66,910 | 0.0020 | 0.9980 | 81.15 |
| 22.5 | 33,080,894 | 35,887 | 0.0011 | 0.9989 | 80.98 |
| 23.5 | 32,821,223 | 34,419 | 0.0010 | 0.9990 | 80.89 |
| 24.5 | 32,650,258 | 66,998 | 0.0021 | 0.9979 | 80.81 |
| 25.5 | 30,874,977 | 526,647 | 0.0171 | 0.9829 | 80.64 |
| 26.5 | 8,899,240 | 33,373 | 0.0038 | 0.9962 | 79.27 |
| 27.5 | 8,611,291 | | 0.0000 | 1.0000 | 78.97 |
| 28.5 | 7,364,753 | 126,226 | 0.0171 | 0.9829 | 78.97 |
| 29.5 | 6,738,268 | 44,289 | 0.0066 | 0.9934 | 77.62 |
| 30.5 | 6,471,512 | 46,983 | 0.0073 | 0.9927 | 77.11 |
| 31.5 | 6,173,052 | 3,730 | 0.0006 | 0.9994 | 76.55 |
| 32.5 | 6,052,164 | 14,175 | 0.0023 | 0.9977 | 76.50 |
| 33.5 | 5,143,479 | 58,976 | 0.0115 | 0.9885 | 76.32 |
| 34.5 | 4,896,879 | 27,511 | 0.0056 | 0.9944 | 75.45 |
| 35.5 | 4,261,803 | 13,489 | 0.0032 | 0.9968 | 75.02 |
| 36.5 | 4,115,454 | 5,307 | 0.0013 | 0.9987 | 74.79 |
| 37.5 | 4,093,941 | 40,283 | 0.0098 | 0.9902 | 74.69 |
| 38.5 | 3,616,834 | | 0.0000 | 1.0000 | 73.95 |

NEWFOUNDLAND AND LABRADOR HYDRO

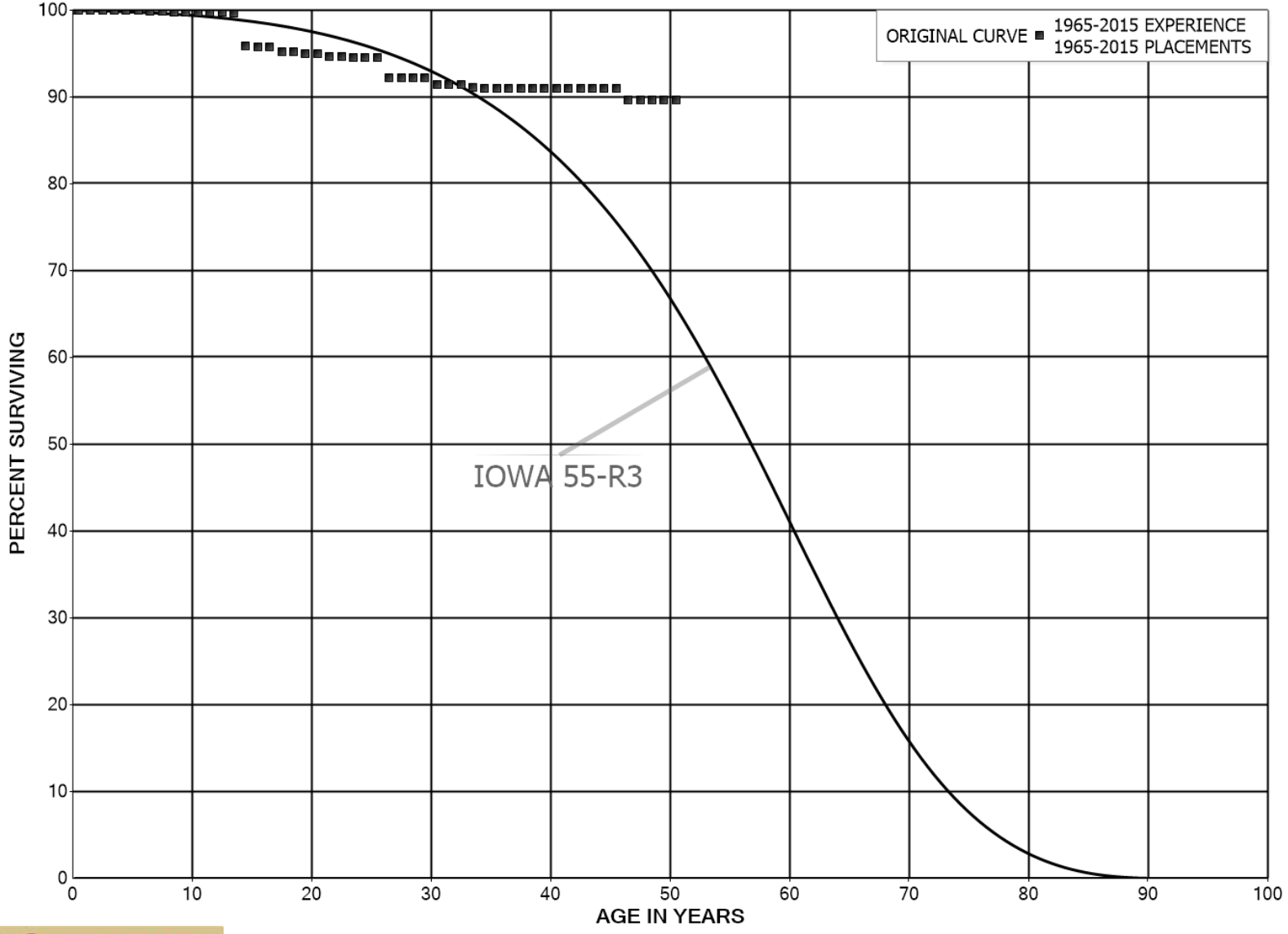
ACCOUNT B05 - BUILDINGS - OTHER

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 3,616,834 | | 0.0000 | 1.0000 | 73.95 |
| 40.5 | 2,711,994 | | 0.0000 | 1.0000 | 73.95 |
| 41.5 | 2,686,482 | | 0.0000 | 1.0000 | 73.95 |
| 42.5 | 2,409,250 | | 0.0000 | 1.0000 | 73.95 |
| 43.5 | 2,345,598 | 18,731 | 0.0080 | 0.9920 | 73.95 |
| 44.5 | 2,277,587 | 27,000 | 0.0119 | 0.9881 | 73.36 |
| 45.5 | 2,128,116 | | 0.0000 | 1.0000 | 72.49 |
| 46.5 | 2,025,591 | | 0.0000 | 1.0000 | 72.49 |
| 47.5 | 321,303 | | 0.0000 | 1.0000 | 72.49 |
| 48.5 | | | | | 72.49 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT B06 - BUILDINGS - METAL
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B06 - BUILDINGS - METAL

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 35,996,791 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 25,168,176 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 24,278,983 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 24,278,983 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 24,278,983 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 24,247,337 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 24,247,337 | 41,104 | 0.0017 | 0.9983 | 100.00 |
| 6.5 | 24,058,787 | | 0.0000 | 1.0000 | 99.83 |
| 7.5 | 24,040,969 | 18,990 | 0.0008 | 0.9992 | 99.83 |
| 8.5 | 23,972,589 | 15,545 | 0.0006 | 0.9994 | 99.75 |
| 9.5 | 23,957,044 | | 0.0000 | 1.0000 | 99.69 |
| 10.5 | 23,672,091 | | 0.0000 | 1.0000 | 99.69 |
| 11.5 | 23,621,849 | | 0.0000 | 1.0000 | 99.69 |
| 12.5 | 23,454,997 | 14,030 | 0.0006 | 0.9994 | 99.69 |
| 13.5 | 22,659,992 | 864,917 | 0.0382 | 0.9618 | 99.63 |
| 14.5 | 21,685,002 | 29,906 | 0.0014 | 0.9986 | 95.82 |
| 15.5 | 21,655,096 | | 0.0000 | 1.0000 | 95.69 |
| 16.5 | 21,655,096 | 112,921 | 0.0052 | 0.9948 | 95.69 |
| 17.5 | 21,365,644 | | 0.0000 | 1.0000 | 95.19 |
| 18.5 | 21,365,644 | 54,966 | 0.0026 | 0.9974 | 95.19 |
| 19.5 | 20,800,414 | | 0.0000 | 1.0000 | 94.95 |
| 20.5 | 20,696,799 | 76,056 | 0.0037 | 0.9963 | 94.95 |
| 21.5 | 20,608,897 | | 0.0000 | 1.0000 | 94.60 |
| 22.5 | 20,117,742 | 26,025 | 0.0013 | 0.9987 | 94.60 |
| 23.5 | 19,159,276 | 0 | 0.0000 | 1.0000 | 94.48 |
| 24.5 | 17,668,718 | | 0.0000 | 1.0000 | 94.48 |
| 25.5 | 16,093,101 | 393,729 | 0.0245 | 0.9755 | 94.48 |
| 26.5 | 15,552,437 | | 0.0000 | 1.0000 | 92.17 |
| 27.5 | 15,116,988 | | 0.0000 | 1.0000 | 92.17 |
| 28.5 | 14,832,765 | | 0.0000 | 1.0000 | 92.17 |
| 29.5 | 14,816,075 | 115,181 | 0.0078 | 0.9922 | 92.17 |
| 30.5 | 14,613,697 | | 0.0000 | 1.0000 | 91.45 |
| 31.5 | 14,205,534 | | 0.0000 | 1.0000 | 91.45 |
| 32.5 | 12,806,433 | 57,461 | 0.0045 | 0.9955 | 91.45 |
| 33.5 | 10,823,937 | 5,733 | 0.0005 | 0.9995 | 91.04 |
| 34.5 | 10,234,044 | | 0.0000 | 1.0000 | 90.99 |
| 35.5 | 7,095,177 | | 0.0000 | 1.0000 | 90.99 |
| 36.5 | 6,847,351 | | 0.0000 | 1.0000 | 90.99 |
| 37.5 | 6,163,042 | 6,800 | 0.0011 | 0.9989 | 90.99 |
| 38.5 | 6,043,170 | | 0.0000 | 1.0000 | 90.89 |

NEWFOUNDLAND AND LABRADOR HYDRO

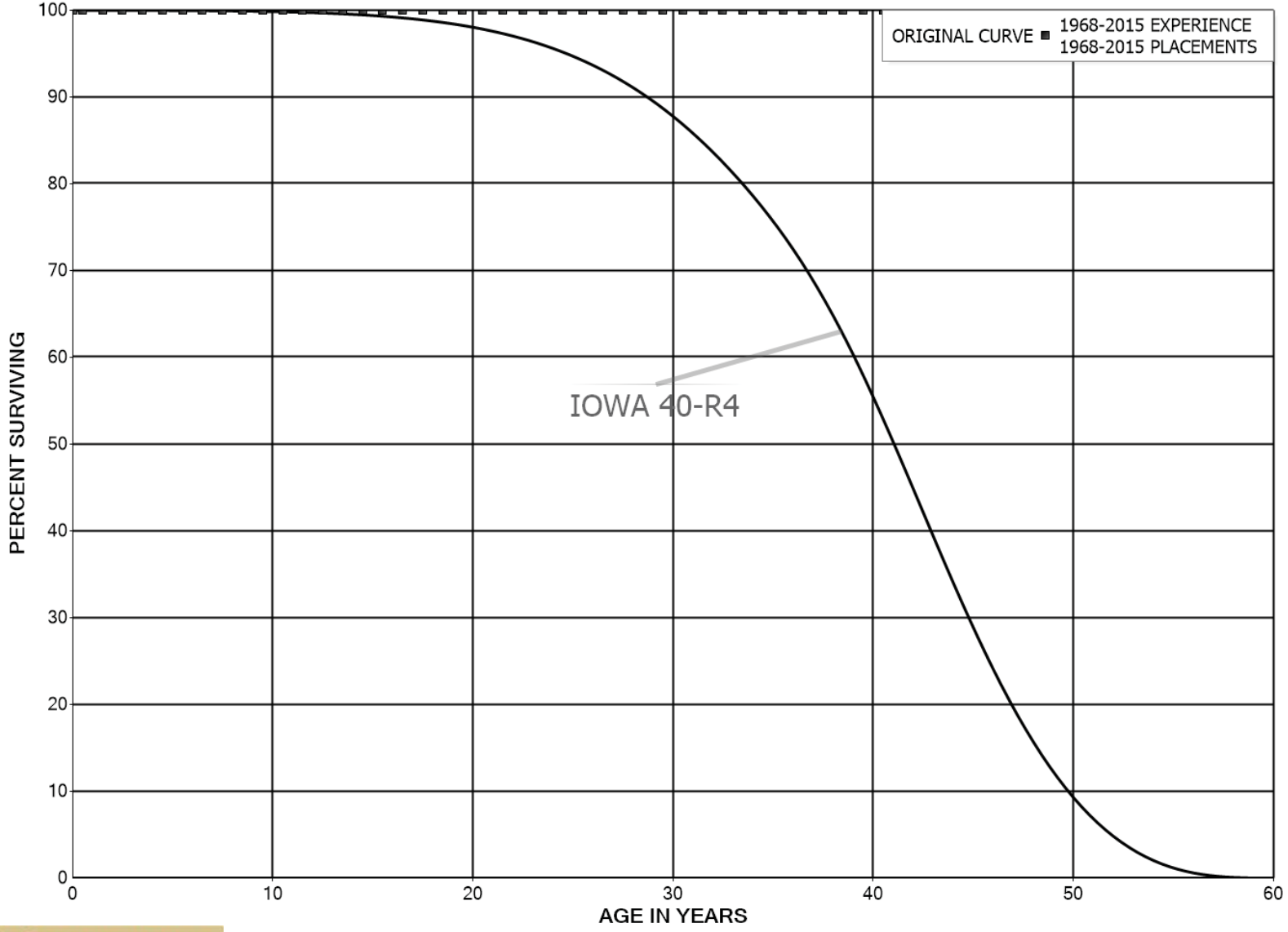
ACCOUNT B06 - BUILDINGS - METAL

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 5,731,924 | | 0.0000 | 1.0000 | 90.89 |
| 40.5 | 5,180,227 | | 0.0000 | 1.0000 | 90.89 |
| 41.5 | 5,180,227 | | 0.0000 | 1.0000 | 90.89 |
| 42.5 | 5,180,227 | | 0.0000 | 1.0000 | 90.89 |
| 43.5 | 5,180,227 | | 0.0000 | 1.0000 | 90.89 |
| 44.5 | 4,480,030 | | 0.0000 | 1.0000 | 90.89 |
| 45.5 | 4,332,844 | 62,342 | 0.0144 | 0.9856 | 90.89 |
| 46.5 | 2,926,199 | | 0.0000 | 1.0000 | 89.58 |
| 47.5 | 1,577,877 | | 0.0000 | 1.0000 | 89.58 |
| 48.5 | 781,601 | | 0.0000 | 1.0000 | 89.58 |
| 49.5 | 496,681 | | 0.0000 | 1.0000 | 89.58 |
| 50.5 | | | | | 89.58 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT B07 - BUS DUCT GENERATOR
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B07 - BUS DUCT GENERATOR

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 1,456,108 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 825,804 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 459,833 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 338,955 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 338,955 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 338,955 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 338,955 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 338,955 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 338,955 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 338,955 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 338,955 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

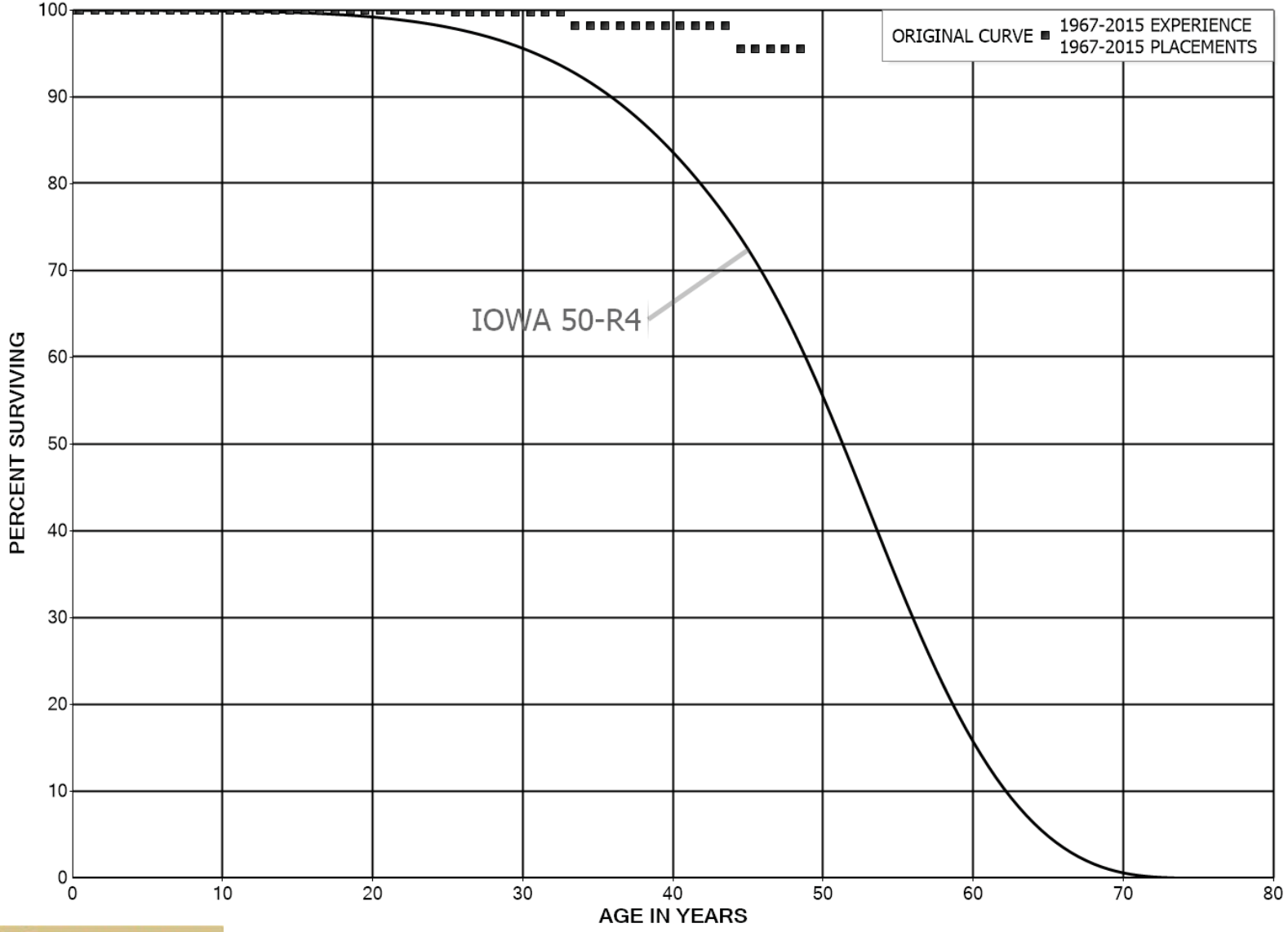
ACCOUNT B07 - BUS DUCT GENERATOR

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 40.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 41.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 42.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 43.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 44.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 45.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 46.5 | 27,238 | | 0.0000 | 1.0000 | 100.00 |
| 47.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT B08 - BUSWORK AND HARDWARE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B08 - BUSWORK AND HARDWARE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 7,379,408 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 7,333,002 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 7,286,779 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 7,286,779 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 6,251,243 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 6,251,243 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 6,251,243 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 6,217,568 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 6,217,568 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 6,217,568 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 6,217,568 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 6,211,235 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 6,099,010 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 6,061,904 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 6,013,333 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 6,013,333 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 5,713,849 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 5,713,849 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 5,387,459 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 5,331,543 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 5,232,676 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 4,767,022 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 4,617,644 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 4,584,516 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 4,029,183 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 3,321,720 | 10,856 | 0.0033 | 0.9967 | 100.00 |
| 25.5 | 3,160,022 | | 0.0000 | 1.0000 | 99.67 |
| 26.5 | 2,759,996 | | 0.0000 | 1.0000 | 99.67 |
| 27.5 | 2,737,453 | | 0.0000 | 1.0000 | 99.67 |
| 28.5 | 2,626,785 | | 0.0000 | 1.0000 | 99.67 |
| 29.5 | 2,542,611 | | 0.0000 | 1.0000 | 99.67 |
| 30.5 | 2,518,812 | | 0.0000 | 1.0000 | 99.67 |
| 31.5 | 2,518,812 | | 0.0000 | 1.0000 | 99.67 |
| 32.5 | 2,352,400 | 35,777 | 0.0152 | 0.9848 | 99.67 |
| 33.5 | 2,078,238 | | 0.0000 | 1.0000 | 98.16 |
| 34.5 | 1,866,029 | | 0.0000 | 1.0000 | 98.16 |
| 35.5 | 1,733,264 | | 0.0000 | 1.0000 | 98.16 |
| 36.5 | 1,577,519 | | 0.0000 | 1.0000 | 98.16 |
| 37.5 | 1,254,807 | | 0.0000 | 1.0000 | 98.16 |
| 38.5 | 1,016,669 | | 0.0000 | 1.0000 | 98.16 |

NEWFOUNDLAND AND LABRADOR HYDRO

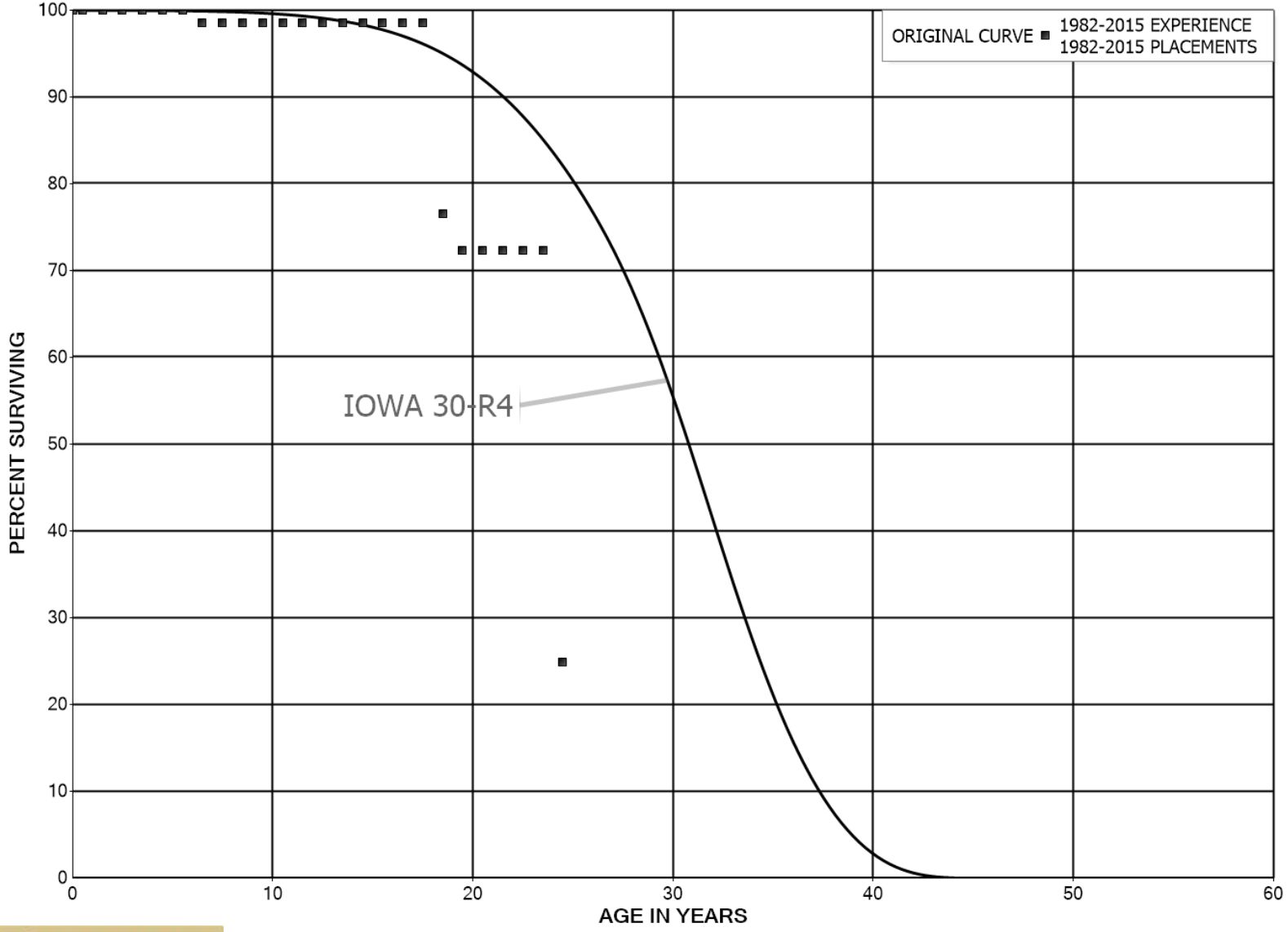
ACCOUNT B08 - BUSWORK AND HARDWARE

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 1,014,371 | | 0.0000 | 1.0000 | 98.16 |
| 40.5 | 946,331 | | 0.0000 | 1.0000 | 98.16 |
| 41.5 | 937,636 | | 0.0000 | 1.0000 | 98.16 |
| 42.5 | 937,636 | | 0.0000 | 1.0000 | 98.16 |
| 43.5 | 937,636 | 24,869 | 0.0265 | 0.9735 | 98.16 |
| 44.5 | 912,767 | | 0.0000 | 1.0000 | 95.55 |
| 45.5 | 391,137 | | 0.0000 | 1.0000 | 95.55 |
| 46.5 | 373,137 | | 0.0000 | 1.0000 | 95.55 |
| 47.5 | 268,548 | | 0.0000 | 1.0000 | 95.55 |
| 48.5 | | | | | 95.55 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C01 - CABLES - TELECONTROL
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

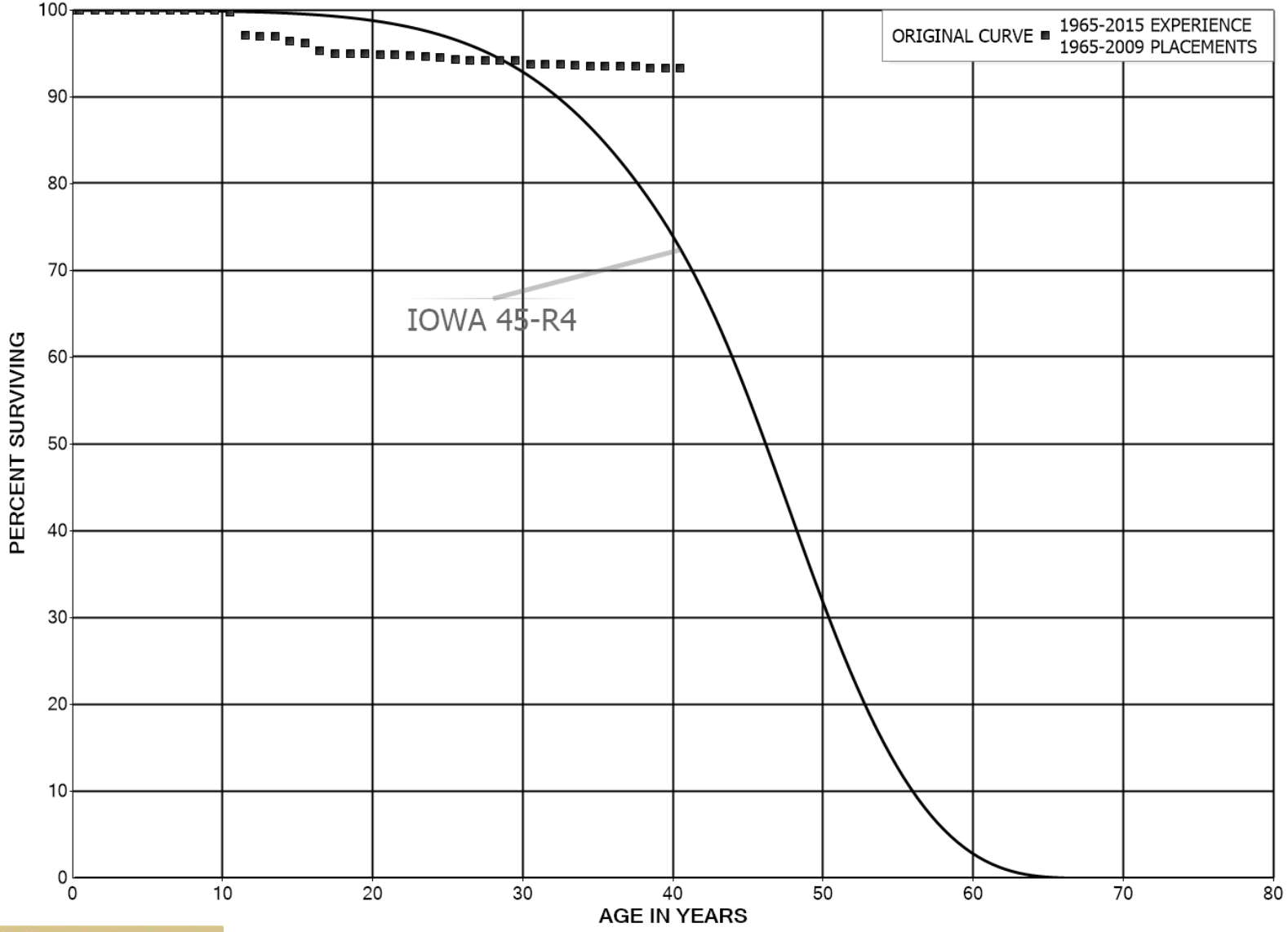
ACCOUNT C01 - CABLES - TELECONTROL

ORIGINAL LIFE TABLE

PLACEMENT BAND 1982-2015 EXPERIENCE BAND 1982-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 2,838,620 | 0 | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 2,836,079 | 0 | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 2,836,079 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 2,824,227 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,900,728 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 1,900,728 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 1,801,277 | 27,391 | 0.0152 | 0.9848 | 100.00 |
| 6.5 | 1,773,885 | | 0.0000 | 1.0000 | 98.48 |
| 7.5 | 1,773,885 | | 0.0000 | 1.0000 | 98.48 |
| 8.5 | 1,773,885 | | 0.0000 | 1.0000 | 98.48 |
| 9.5 | 1,773,885 | | 0.0000 | 1.0000 | 98.48 |
| 10.5 | 1,773,885 | | 0.0000 | 1.0000 | 98.48 |
| 11.5 | 1,684,136 | | 0.0000 | 1.0000 | 98.48 |
| 12.5 | 791,888 | | 0.0000 | 1.0000 | 98.48 |
| 13.5 | 531,510 | | 0.0000 | 1.0000 | 98.48 |
| 14.5 | 401,932 | | 0.0000 | 1.0000 | 98.48 |
| 15.5 | 379,901 | | 0.0000 | 1.0000 | 98.48 |
| 16.5 | 203,293 | | 0.0000 | 1.0000 | 98.48 |
| 17.5 | 203,293 | 45,443 | 0.2235 | 0.7765 | 98.48 |
| 18.5 | 157,849 | 8,519 | 0.0540 | 0.9460 | 76.47 |
| 19.5 | 149,330 | | 0.0000 | 1.0000 | 72.34 |
| 20.5 | 149,330 | | 0.0000 | 1.0000 | 72.34 |
| 21.5 | 149,330 | | 0.0000 | 1.0000 | 72.34 |
| 22.5 | 36,789 | | 0.0000 | 1.0000 | 72.34 |
| 23.5 | 36,789 | 24,177 | 0.6572 | 0.3428 | 72.34 |
| 24.5 | 12,612 | | 0.0000 | 1.0000 | 24.80 |
| 25.5 | 12,612 | | 0.0000 | 1.0000 | 24.80 |
| 26.5 | 12,612 | | 0.0000 | 1.0000 | 24.80 |
| 27.5 | 12,612 | | 0.0000 | 1.0000 | 24.80 |
| 28.5 | 12,612 | | 0.0000 | 1.0000 | 24.80 |
| 29.5 | 12,612 | | 0.0000 | 1.0000 | 24.80 |
| 30.5 | 12,612 | | 0.0000 | 1.0000 | 24.80 |
| 31.5 | 12,612 | | 0.0000 | 1.0000 | 24.80 |
| 32.5 | 12,612 | | 0.0000 | 1.0000 | 24.80 |
| 33.5 | | | | | 24.80 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C02 - CABLE - SUBMARINE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

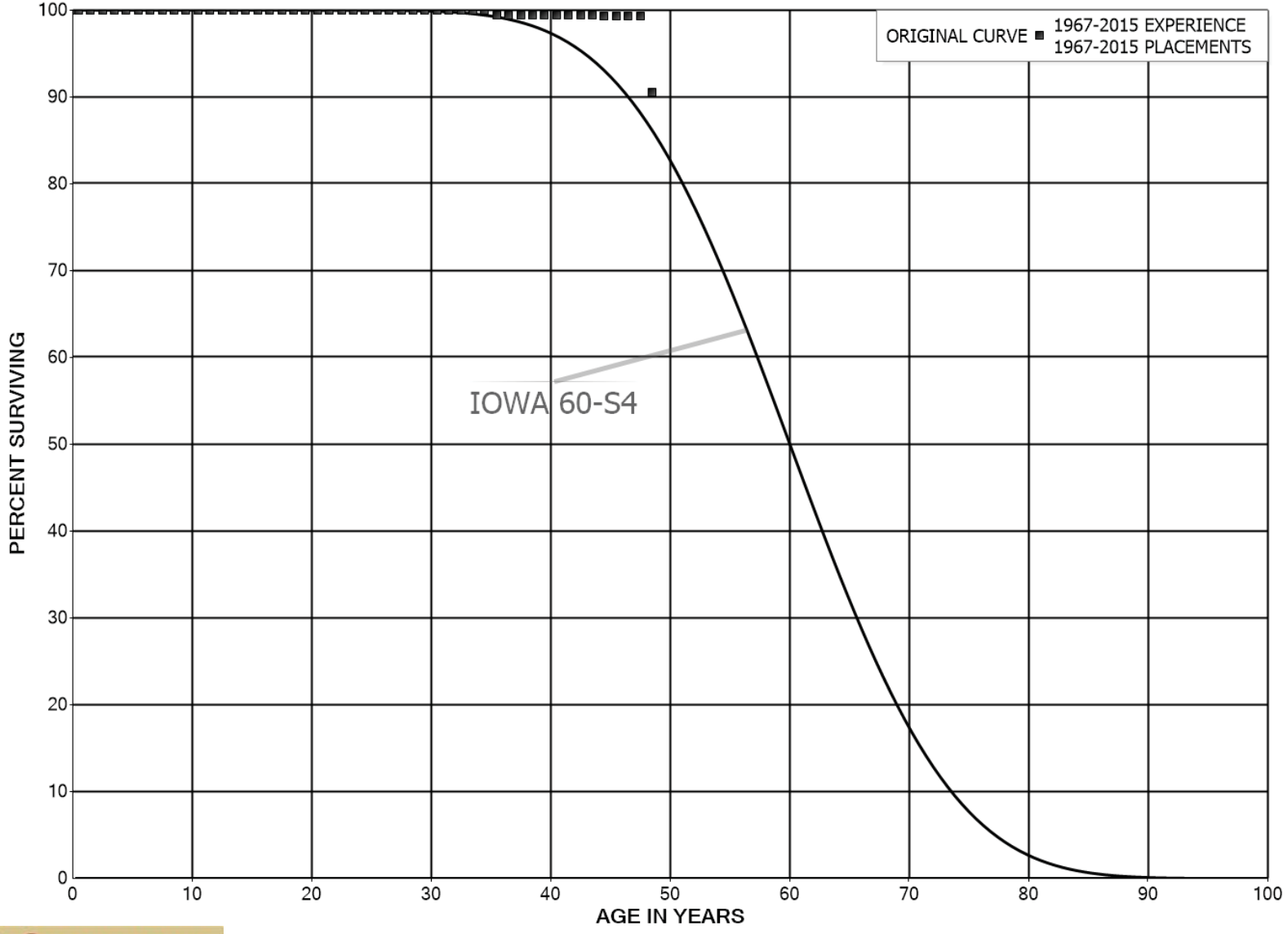
ACCOUNT C02 - CABLE - SUBMARINE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2009 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 9,425,415 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 9,425,415 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 9,425,415 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 9,425,415 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 9,425,415 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 9,425,415 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 9,425,415 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 9,344,728 | 262 | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 9,302,171 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 9,197,890 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 9,197,890 | 24,789 | 0.0027 | 0.9973 | 100.00 |
| 10.5 | 9,173,102 | 245,126 | 0.0267 | 0.9733 | 99.73 |
| 11.5 | 8,927,976 | 10,786 | 0.0012 | 0.9988 | 97.06 |
| 12.5 | 8,917,190 | 2,233 | 0.0003 | 0.9997 | 96.95 |
| 13.5 | 8,914,958 | 48,195 | 0.0054 | 0.9946 | 96.92 |
| 14.5 | 8,866,762 | 19,777 | 0.0022 | 0.9978 | 96.40 |
| 15.5 | 8,846,986 | 87,216 | 0.0099 | 0.9901 | 96.18 |
| 16.5 | 7,837,422 | 21,424 | 0.0027 | 0.9973 | 95.23 |
| 17.5 | 7,815,998 | | 0.0000 | 1.0000 | 94.97 |
| 18.5 | 7,815,998 | 5,358 | 0.0007 | 0.9993 | 94.97 |
| 19.5 | 7,810,640 | 1,990 | 0.0003 | 0.9997 | 94.91 |
| 20.5 | 7,808,650 | 1,297 | 0.0002 | 0.9998 | 94.88 |
| 21.5 | 7,807,353 | 13,145 | 0.0017 | 0.9983 | 94.87 |
| 22.5 | 7,794,208 | 4,245 | 0.0005 | 0.9995 | 94.71 |
| 23.5 | 7,789,963 | 8,605 | 0.0011 | 0.9989 | 94.66 |
| 24.5 | 7,781,358 | 17,612 | 0.0023 | 0.9977 | 94.55 |
| 25.5 | 4,784,397 | 5,538 | 0.0012 | 0.9988 | 94.34 |
| 26.5 | 2,325,408 | | 0.0000 | 1.0000 | 94.23 |
| 27.5 | 775,017 | | 0.0000 | 1.0000 | 94.23 |
| 28.5 | 775,017 | | 0.0000 | 1.0000 | 94.23 |
| 29.5 | 775,017 | 4,602 | 0.0059 | 0.9941 | 94.23 |
| 30.5 | 770,414 | | 0.0000 | 1.0000 | 93.67 |
| 31.5 | 770,414 | | 0.0000 | 1.0000 | 93.67 |
| 32.5 | 770,414 | 39 | 0.0001 | 0.9999 | 93.67 |
| 33.5 | 646,975 | 968 | 0.0015 | 0.9985 | 93.67 |
| 34.5 | 646,007 | 443 | 0.0007 | 0.9993 | 93.53 |
| 35.5 | 476,448 | | 0.0000 | 1.0000 | 93.46 |
| 36.5 | 476,448 | | 0.0000 | 1.0000 | 93.46 |
| 37.5 | 476,448 | 651 | 0.0014 | 0.9986 | 93.46 |
| 38.5 | 475,797 | | 0.0000 | 1.0000 | 93.33 |
| 39.5 | 475,797 | | 0.0000 | 1.0000 | 93.33 |
| 40.5 | | | | | 93.33 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C03 - CABLE - UNDERGROUND
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C03 - CABLE - UNDERGROUND

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 3,395,635 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 2,844,830 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 2,379,940 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 2,270,771 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 1,947,270 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 1,929,618 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 1,861,337 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 1,861,337 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 1,839,011 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 1,839,011 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 1,829,125 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 1,663,088 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 1,663,088 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 1,656,465 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 1,604,291 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 1,510,195 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 1,429,264 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 1,351,971 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 1,351,971 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 1,307,375 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 1,307,375 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 1,307,375 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 1,307,375 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 1,274,153 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 1,174,801 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 1,127,018 | 7,281 | 0.0065 | 0.9935 | 100.00 |
| 35.5 | 513,619 | | 0.0000 | 1.0000 | 99.35 |
| 36.5 | 429,332 | | 0.0000 | 1.0000 | 99.35 |
| 37.5 | 344,220 | | 0.0000 | 1.0000 | 99.35 |
| 38.5 | 337,437 | | 0.0000 | 1.0000 | 99.35 |

NEWFOUNDLAND AND LABRADOR HYDRO

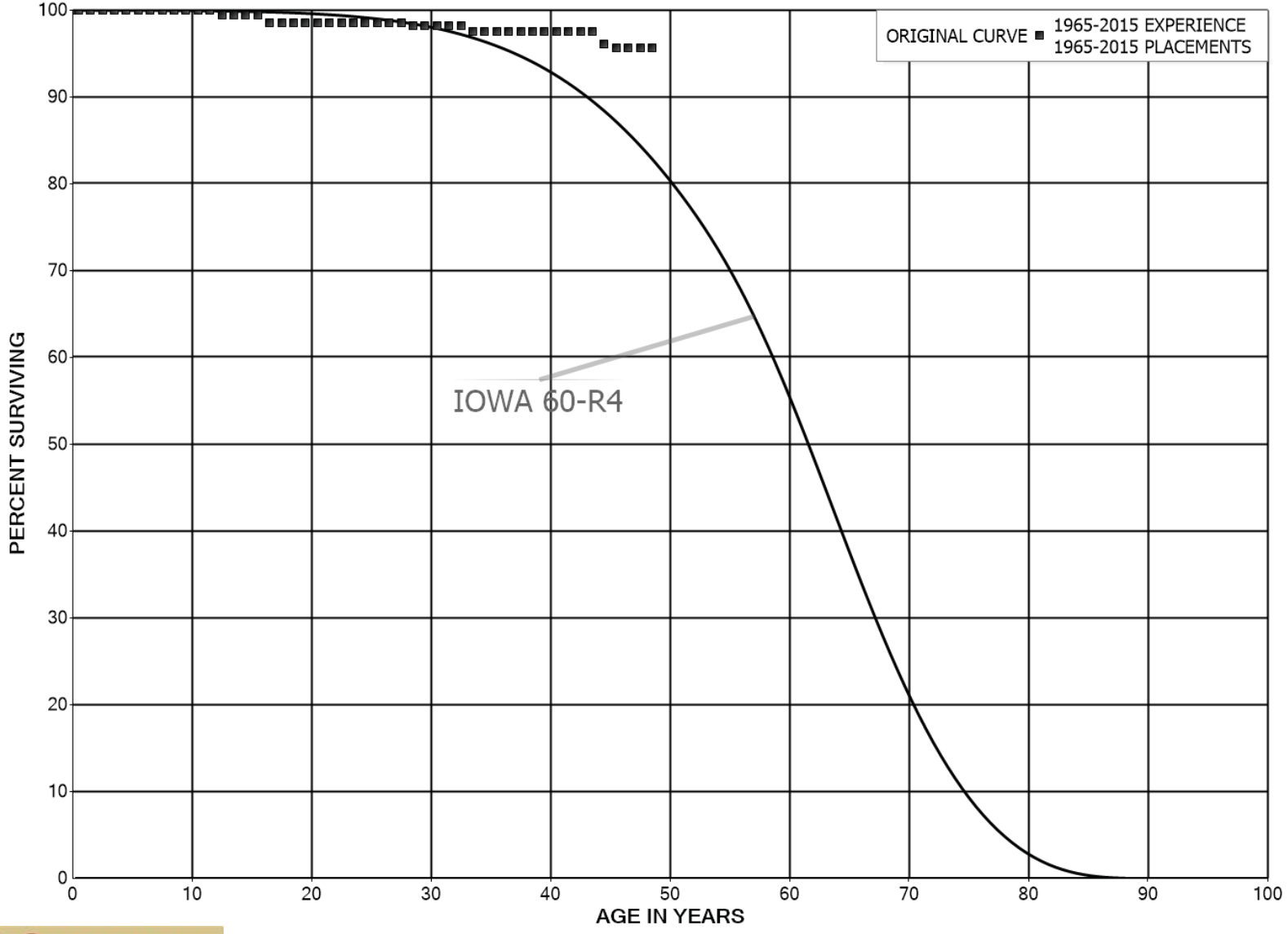
ACCOUNT C03 - CABLE - UNDERGROUND

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 333,739 | | 0.0000 | 1.0000 | 99.35 |
| 40.5 | 318,436 | | 0.0000 | 1.0000 | 99.35 |
| 41.5 | 318,436 | | 0.0000 | 1.0000 | 99.35 |
| 42.5 | 318,436 | | 0.0000 | 1.0000 | 99.35 |
| 43.5 | 305,575 | 188 | 0.0006 | 0.9994 | 99.35 |
| 44.5 | 276,579 | | 0.0000 | 1.0000 | 99.29 |
| 45.5 | 141,503 | | 0.0000 | 1.0000 | 99.29 |
| 46.5 | 141,503 | | 0.0000 | 1.0000 | 99.29 |
| 47.5 | 74,406 | 6,571 | 0.0883 | 0.9117 | 99.29 |
| 48.5 | | | | | 90.52 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C04 - CABLE - ABOVE GROUND
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C04 - CABLE - ABOVE GROUND

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 11,401,564 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 11,299,810 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 11,299,810 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 11,137,698 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 10,286,672 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 9,987,308 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 9,926,759 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 9,926,759 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 9,926,759 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 9,926,759 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 9,884,286 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 9,769,662 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 9,769,662 | 63,219 | 0.0065 | 0.9935 | 100.00 |
| 12.5 | 9,614,621 | | 0.0000 | 1.0000 | 99.35 |
| 13.5 | 9,580,028 | | 0.0000 | 1.0000 | 99.35 |
| 14.5 | 9,464,487 | | 0.0000 | 1.0000 | 99.35 |
| 15.5 | 9,346,771 | 84,913 | 0.0091 | 0.9909 | 99.35 |
| 16.5 | 9,174,365 | | 0.0000 | 1.0000 | 98.45 |
| 17.5 | 8,884,088 | | 0.0000 | 1.0000 | 98.45 |
| 18.5 | 8,863,231 | | 0.0000 | 1.0000 | 98.45 |
| 19.5 | 8,769,635 | | 0.0000 | 1.0000 | 98.45 |
| 20.5 | 8,542,287 | | 0.0000 | 1.0000 | 98.45 |
| 21.5 | 7,870,443 | | 0.0000 | 1.0000 | 98.45 |
| 22.5 | 7,815,792 | | 0.0000 | 1.0000 | 98.45 |
| 23.5 | 7,433,724 | | 0.0000 | 1.0000 | 98.45 |
| 24.5 | 6,964,552 | | 0.0000 | 1.0000 | 98.45 |
| 25.5 | 6,674,759 | | 0.0000 | 1.0000 | 98.45 |
| 26.5 | 6,267,887 | | 0.0000 | 1.0000 | 98.45 |
| 27.5 | 6,150,181 | 19,117 | 0.0031 | 0.9969 | 98.45 |
| 28.5 | 5,978,081 | | 0.0000 | 1.0000 | 98.14 |
| 29.5 | 5,893,892 | | 0.0000 | 1.0000 | 98.14 |
| 30.5 | 4,979,674 | | 0.0000 | 1.0000 | 98.14 |
| 31.5 | 4,952,895 | | 0.0000 | 1.0000 | 98.14 |
| 32.5 | 4,388,615 | 27,298 | 0.0062 | 0.9938 | 98.14 |
| 33.5 | 4,088,745 | 134 | 0.0000 | 1.0000 | 97.53 |
| 34.5 | 4,023,163 | | 0.0000 | 1.0000 | 97.53 |
| 35.5 | 2,236,296 | | 0.0000 | 1.0000 | 97.53 |
| 36.5 | 2,091,333 | | 0.0000 | 1.0000 | 97.53 |
| 37.5 | 1,565,100 | | 0.0000 | 1.0000 | 97.53 |
| 38.5 | 1,447,446 | | 0.0000 | 1.0000 | 97.53 |

NEWFOUNDLAND AND LABRADOR HYDRO

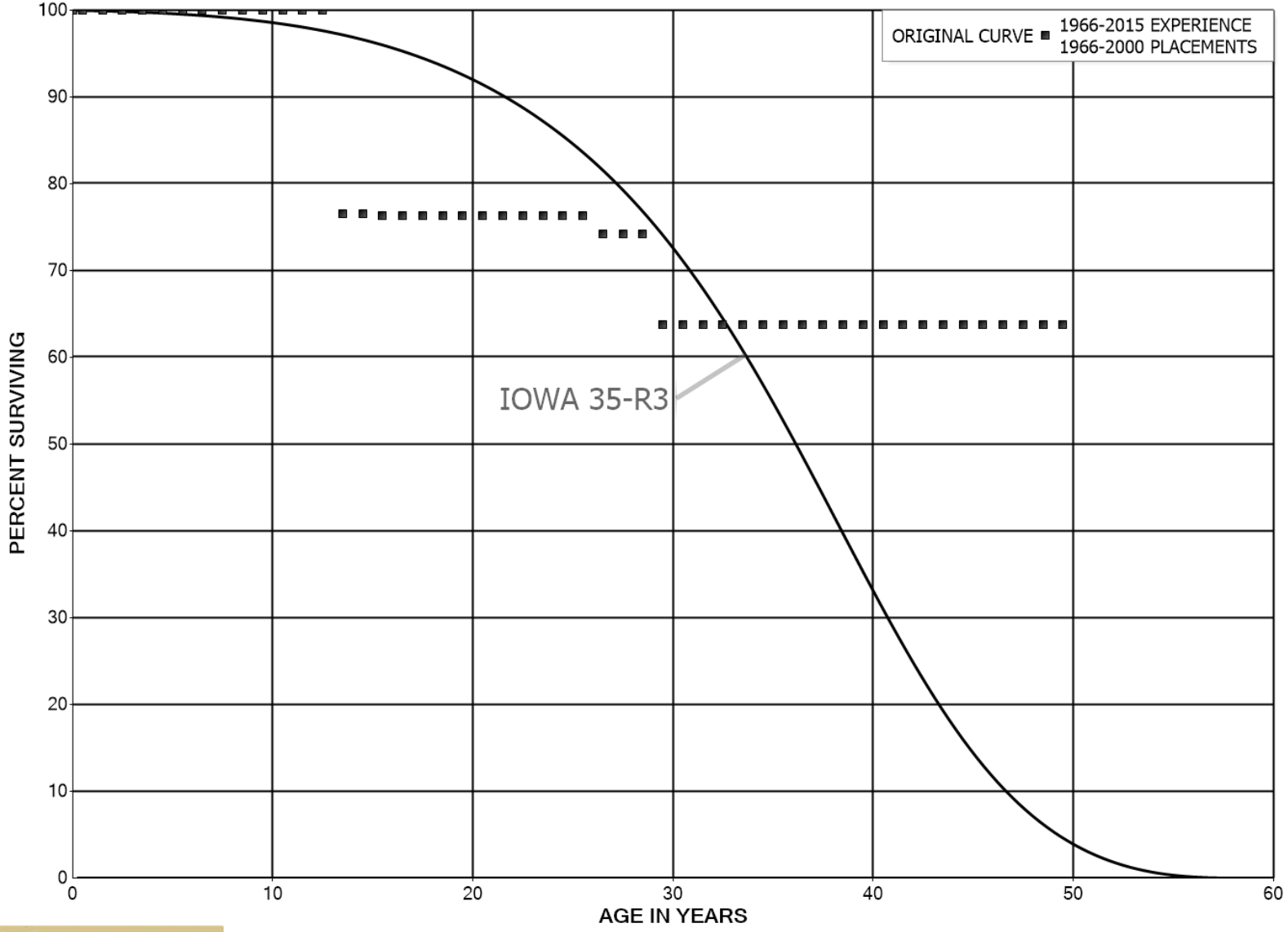
ACCOUNT C04 - CABLE - ABOVE GROUND

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 1,429,253 | | 0.0000 | 1.0000 | 97.53 |
| 40.5 | 1,415,740 | | 0.0000 | 1.0000 | 97.53 |
| 41.5 | 1,360,687 | | 0.0000 | 1.0000 | 97.53 |
| 42.5 | 1,359,668 | | 0.0000 | 1.0000 | 97.53 |
| 43.5 | 1,359,668 | 20,755 | 0.0153 | 0.9847 | 97.53 |
| 44.5 | 1,145,684 | 5,372 | 0.0047 | 0.9953 | 96.04 |
| 45.5 | 808,553 | | 0.0000 | 1.0000 | 95.59 |
| 46.5 | 808,553 | | 0.0000 | 1.0000 | 95.59 |
| 47.5 | 176,786 | | 0.0000 | 1.0000 | 95.59 |
| 48.5 | | | | | 95.59 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C06 - CAPACITORS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C06 - CAPACITORS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2000 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 1,417,922 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 1,417,922 | 332,373 | 0.2344 | 0.7656 | 100.00 |
| 13.5 | 1,085,549 | | 0.0000 | 1.0000 | 76.56 |
| 14.5 | 1,085,549 | 4,448 | 0.0041 | 0.9959 | 76.56 |
| 15.5 | 924,455 | | 0.0000 | 1.0000 | 76.25 |
| 16.5 | 924,455 | | 0.0000 | 1.0000 | 76.25 |
| 17.5 | 924,455 | | 0.0000 | 1.0000 | 76.25 |
| 18.5 | 924,455 | | 0.0000 | 1.0000 | 76.25 |
| 19.5 | 608,625 | | 0.0000 | 1.0000 | 76.25 |
| 20.5 | 599,093 | | 0.0000 | 1.0000 | 76.25 |
| 21.5 | 599,093 | | 0.0000 | 1.0000 | 76.25 |
| 22.5 | 599,093 | | 0.0000 | 1.0000 | 76.25 |
| 23.5 | 599,093 | | 0.0000 | 1.0000 | 76.25 |
| 24.5 | 599,093 | | 0.0000 | 1.0000 | 76.25 |
| 25.5 | 599,093 | 16,678 | 0.0278 | 0.9722 | 76.25 |
| 26.5 | 582,416 | | 0.0000 | 1.0000 | 74.12 |
| 27.5 | 582,416 | | 0.0000 | 1.0000 | 74.12 |
| 28.5 | 498,690 | 69,680 | 0.1397 | 0.8603 | 74.12 |
| 29.5 | 429,010 | | 0.0000 | 1.0000 | 63.77 |
| 30.5 | 429,010 | | 0.0000 | 1.0000 | 63.77 |
| 31.5 | 429,010 | | 0.0000 | 1.0000 | 63.77 |
| 32.5 | 429,010 | | 0.0000 | 1.0000 | 63.77 |
| 33.5 | 405,743 | | 0.0000 | 1.0000 | 63.77 |
| 34.5 | 405,743 | | 0.0000 | 1.0000 | 63.77 |
| 35.5 | 332,630 | | 0.0000 | 1.0000 | 63.77 |
| 36.5 | 332,630 | | 0.0000 | 1.0000 | 63.77 |
| 37.5 | 332,630 | | 0.0000 | 1.0000 | 63.77 |
| 38.5 | 332,630 | | 0.0000 | 1.0000 | 63.77 |

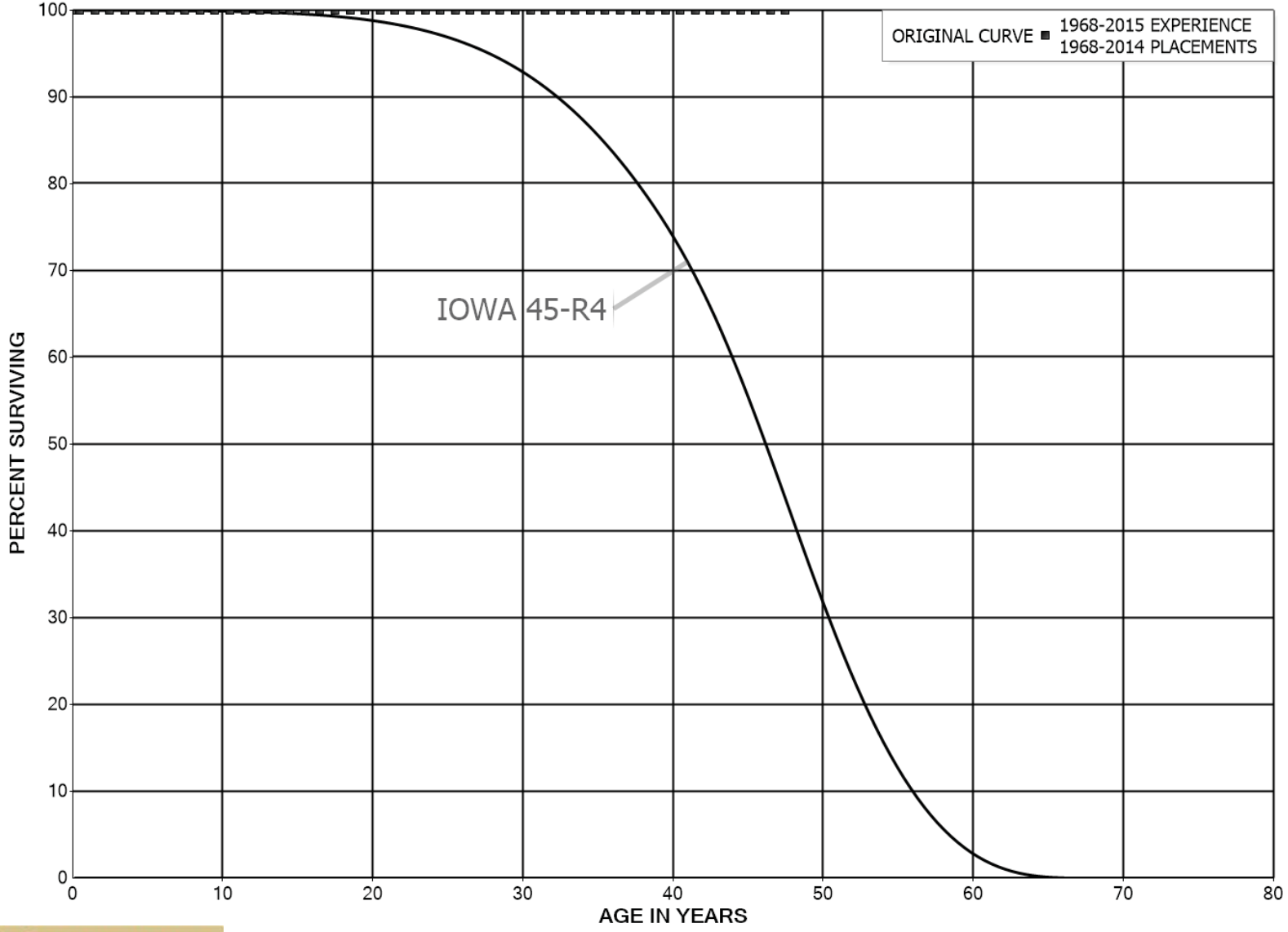
NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C06 - CAPACITORS

ORIGINAL LIFE TABLE, CONT.

| PLACEMENT BAND 1966-2000 | | | EXPERIENCE BAND 1966-2015 | | |
|---|---|---|---|---|---|
| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
| 39.5 | 308,195 | | 0.0000 | 1.0000 | 63.77 |
| 40.5 | 308,195 | | 0.0000 | 1.0000 | 63.77 |
| 41.5 | 308,195 | | 0.0000 | 1.0000 | 63.77 |
| 42.5 | 308,195 | | 0.0000 | 1.0000 | 63.77 |
| 43.5 | 308,195 | | 0.0000 | 1.0000 | 63.77 |
| 44.5 | 47,294 | | 0.0000 | 1.0000 | 63.77 |
| 45.5 | 44,471 | | 0.0000 | 1.0000 | 63.77 |
| 46.5 | 44,471 | | 0.0000 | 1.0000 | 63.77 |
| 47.5 | 44,471 | | 0.0000 | 1.0000 | 63.77 |
| 48.5 | 44,471 | | 0.0000 | 1.0000 | 63.77 |
| 49.5 | | | | | 63.77 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C07 - CHEMICAL FEED SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C07 - CHEMICAL FEED SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2014 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 586,296 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 586,296 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 573,005 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 544,329 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 544,329 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 476,006 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 476,006 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 476,006 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 476,006 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 476,006 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 476,006 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 476,006 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 476,006 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 467,165 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 467,165 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 467,165 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 467,165 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 467,165 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 467,165 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 467,165 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 417,847 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 367,295 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 367,295 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | 367,295 | | 0.0000 | 1.0000 | 100.00 |

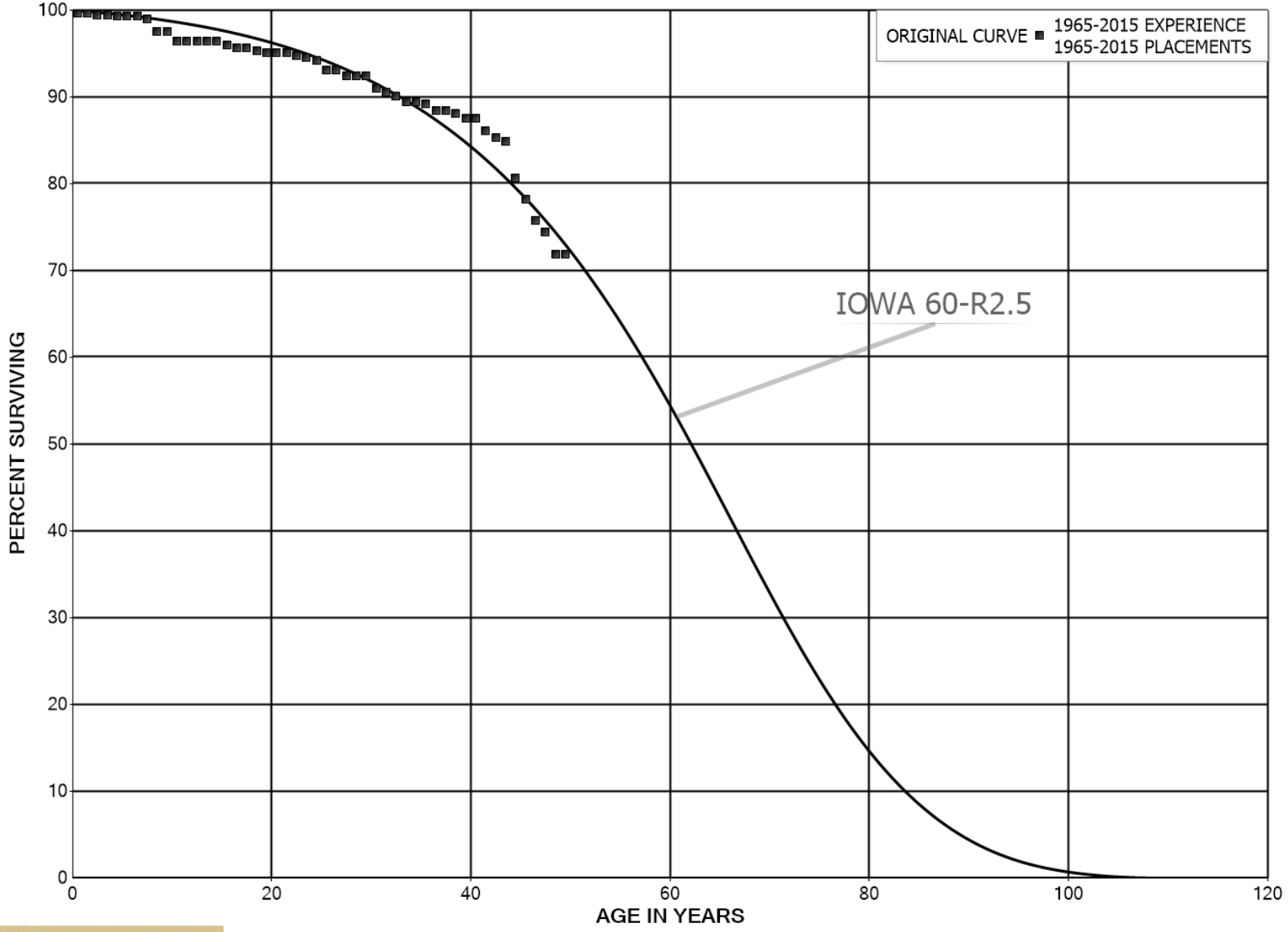
NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C07 - CHEMICAL FEED SYSTEMS

ORIGINAL LIFE TABLE, CONT.

| PLACEMENT BAND 1968-2014 | | | EXPERIENCE BAND 1968-2015 | | |
|---|---|---|---|---|---|
| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
| 39.5 | 367,295 | | 0.0000 | 1.0000 | 100.00 |
| 40.5 | 367,295 | | 0.0000 | 1.0000 | 100.00 |
| 41.5 | 367,295 | | 0.0000 | 1.0000 | 100.00 |
| 42.5 | 367,295 | | 0.0000 | 1.0000 | 100.00 |
| 43.5 | 367,295 | | 0.0000 | 1.0000 | 100.00 |
| 44.5 | 295,111 | | 0.0000 | 1.0000 | 100.00 |
| 45.5 | 295,111 | | 0.0000 | 1.0000 | 100.00 |
| 46.5 | 50,552 | | 0.0000 | 1.0000 | 100.00 |
| 47.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C09 - CIRCUIT BREAKERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C09 - CIRCUIT BREAKERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 42,408,089 | 160,899 | 0.0038 | 0.9962 | 100.00 |
| 0.5 | 28,938,215 | | 0.0000 | 1.0000 | 99.62 |
| 1.5 | 27,073,477 | 51,514 | 0.0019 | 0.9981 | 99.62 |
| 2.5 | 23,420,774 | | 0.0000 | 1.0000 | 99.43 |
| 3.5 | 20,102,925 | 27,294 | 0.0014 | 0.9986 | 99.43 |
| 4.5 | 19,123,433 | 7,293 | 0.0004 | 0.9996 | 99.30 |
| 5.5 | 18,642,875 | | 0.0000 | 1.0000 | 99.26 |
| 6.5 | 18,034,521 | 60,978 | 0.0034 | 0.9966 | 99.26 |
| 7.5 | 17,678,078 | 249,244 | 0.0141 | 0.9859 | 98.92 |
| 8.5 | 17,139,665 | | 0.0000 | 1.0000 | 97.53 |
| 9.5 | 16,953,058 | 200,915 | 0.0119 | 0.9881 | 97.53 |
| 10.5 | 16,702,131 | | 0.0000 | 1.0000 | 96.37 |
| 11.5 | 16,621,648 | | 0.0000 | 1.0000 | 96.37 |
| 12.5 | 16,272,210 | | 0.0000 | 1.0000 | 96.37 |
| 13.5 | 15,850,732 | | 0.0000 | 1.0000 | 96.37 |
| 14.5 | 15,832,173 | 67,355 | 0.0043 | 0.9957 | 96.37 |
| 15.5 | 15,499,963 | 58,294 | 0.0038 | 0.9962 | 95.96 |
| 16.5 | 15,441,670 | | 0.0000 | 1.0000 | 95.60 |
| 17.5 | 15,287,303 | 50,464 | 0.0033 | 0.9967 | 95.60 |
| 18.5 | 15,043,281 | 40,862 | 0.0027 | 0.9973 | 95.29 |
| 19.5 | 14,573,151 | | 0.0000 | 1.0000 | 95.03 |
| 20.5 | 13,743,654 | | 0.0000 | 1.0000 | 95.03 |
| 21.5 | 13,718,206 | 47,162 | 0.0034 | 0.9966 | 95.03 |
| 22.5 | 13,398,595 | 20,279 | 0.0015 | 0.9985 | 94.70 |
| 23.5 | 12,287,999 | 45,251 | 0.0037 | 0.9963 | 94.56 |
| 24.5 | 12,137,656 | 149,323 | 0.0123 | 0.9877 | 94.21 |
| 25.5 | 11,610,539 | | 0.0000 | 1.0000 | 93.05 |
| 26.5 | 11,025,638 | 72,655 | 0.0066 | 0.9934 | 93.05 |
| 27.5 | 10,808,151 | | 0.0000 | 1.0000 | 92.44 |
| 28.5 | 10,733,766 | | 0.0000 | 1.0000 | 92.44 |
| 29.5 | 10,696,675 | 173,483 | 0.0162 | 0.9838 | 92.44 |
| 30.5 | 10,483,633 | 46,776 | 0.0045 | 0.9955 | 90.94 |
| 31.5 | 10,436,857 | 56,847 | 0.0054 | 0.9946 | 90.53 |
| 32.5 | 10,067,873 | 75,026 | 0.0075 | 0.9925 | 90.04 |
| 33.5 | 8,982,702 | | 0.0000 | 1.0000 | 89.37 |
| 34.5 | 8,780,905 | 22,391 | 0.0025 | 0.9975 | 89.37 |
| 35.5 | 8,005,967 | 65,599 | 0.0082 | 0.9918 | 89.14 |
| 36.5 | 7,862,991 | | 0.0000 | 1.0000 | 88.41 |
| 37.5 | 7,494,955 | 32,264 | 0.0043 | 0.9957 | 88.41 |
| 38.5 | 6,871,566 | 43,798 | 0.0064 | 0.9936 | 88.03 |

NEWFOUNDLAND AND LABRADOR HYDRO

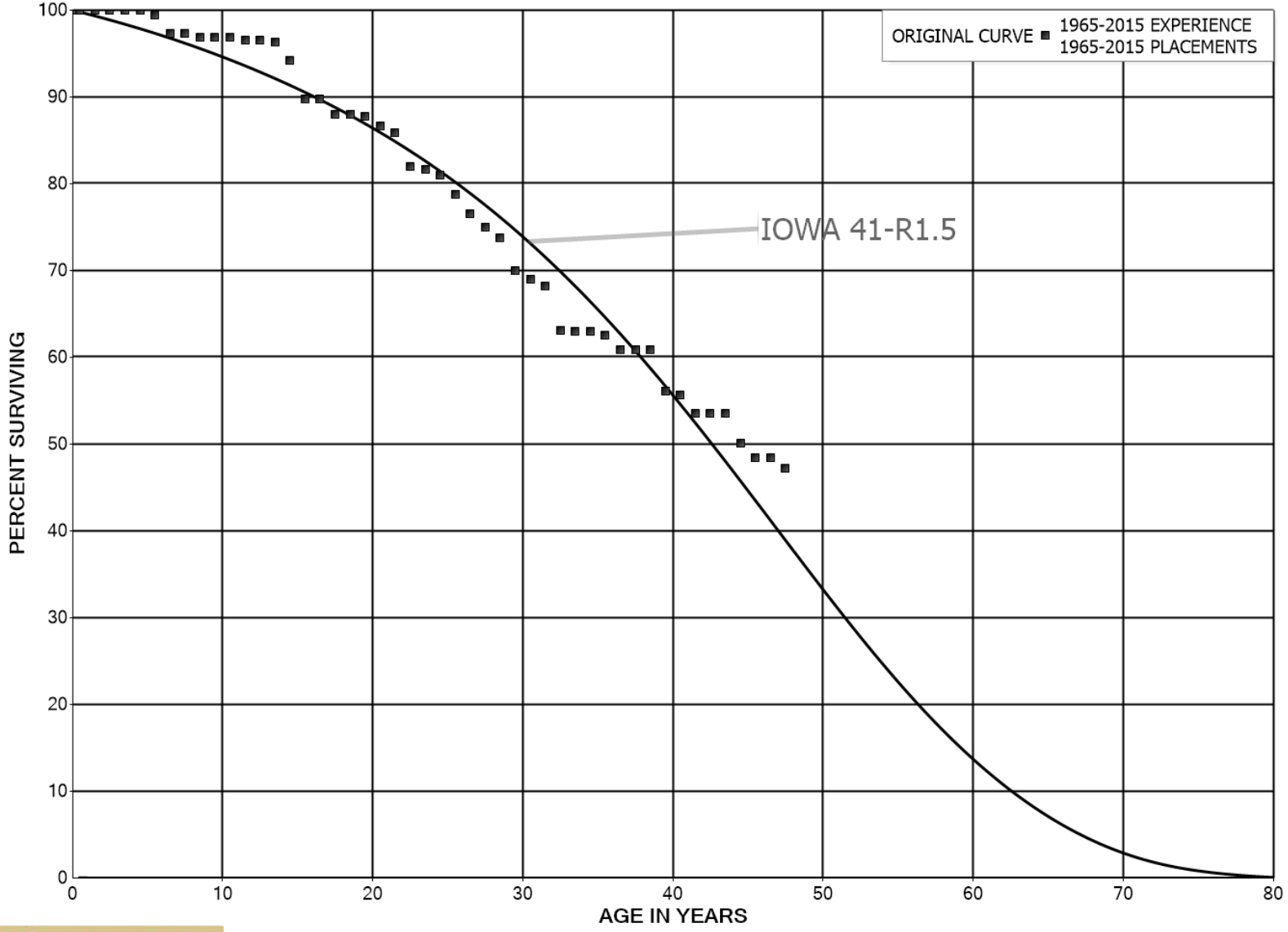
ACCOUNT C09 - CIRCUIT BREAKERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 6,781,445 | | 0.0000 | 1.0000 | 87.47 |
| 40.5 | 6,497,180 | 102,890 | 0.0158 | 0.9842 | 87.47 |
| 41.5 | 6,251,013 | 54,215 | 0.0087 | 0.9913 | 86.08 |
| 42.5 | 6,196,798 | 32,682 | 0.0053 | 0.9947 | 85.34 |
| 43.5 | 5,594,010 | 278,870 | 0.0499 | 0.9501 | 84.89 |
| 44.5 | 4,868,135 | 149,825 | 0.0308 | 0.9692 | 80.65 |
| 45.5 | 3,050,359 | 94,629 | 0.0310 | 0.9690 | 78.17 |
| 46.5 | 2,843,847 | 49,956 | 0.0176 | 0.9824 | 75.75 |
| 47.5 | 1,997,293 | 68,207 | 0.0341 | 0.9659 | 74.42 |
| 48.5 | 886,988 | | 0.0000 | 1.0000 | 71.87 |
| 49.5 | 519,843 | 94,176 | 0.1812 | 0.8188 | 71.87 |
| 50.5 | | | | | 58.85 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C10 - COMPRESSED AIR SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C10 - COMPRESSED AIR SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 18,045,846 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 9,907,229 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 7,959,480 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 6,442,427 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 6,442,427 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 5,847,852 | 32,529 | 0.0056 | 0.9944 | 100.00 |
| 5.5 | 5,674,885 | 125,289 | 0.0221 | 0.9779 | 99.44 |
| 6.5 | 5,380,906 | | 0.0000 | 1.0000 | 97.25 |
| 7.5 | 4,943,013 | 19,135 | 0.0039 | 0.9961 | 97.25 |
| 8.5 | 4,678,473 | | 0.0000 | 1.0000 | 96.87 |
| 9.5 | 4,647,855 | | 0.0000 | 1.0000 | 96.87 |
| 10.5 | 4,647,855 | 17,971 | 0.0039 | 0.9961 | 96.87 |
| 11.5 | 4,629,884 | | 0.0000 | 1.0000 | 96.50 |
| 12.5 | 4,429,884 | 10,656 | 0.0024 | 0.9976 | 96.50 |
| 13.5 | 4,377,956 | 96,947 | 0.0221 | 0.9779 | 96.27 |
| 14.5 | 4,133,050 | 192,426 | 0.0466 | 0.9534 | 94.13 |
| 15.5 | 3,745,763 | 1,766 | 0.0005 | 0.9995 | 89.75 |
| 16.5 | 3,579,639 | 70,987 | 0.0198 | 0.9802 | 89.71 |
| 17.5 | 3,425,631 | | 0.0000 | 1.0000 | 87.93 |
| 18.5 | 3,397,099 | 8,231 | 0.0024 | 0.9976 | 87.93 |
| 19.5 | 3,378,212 | 43,863 | 0.0130 | 0.9870 | 87.72 |
| 20.5 | 3,205,312 | 27,663 | 0.0086 | 0.9914 | 86.58 |
| 21.5 | 2,943,004 | 132,489 | 0.0450 | 0.9550 | 85.83 |
| 22.5 | 2,766,426 | 13,168 | 0.0048 | 0.9952 | 81.97 |
| 23.5 | 2,237,625 | 16,940 | 0.0076 | 0.9924 | 81.58 |
| 24.5 | 2,185,057 | 59,522 | 0.0272 | 0.9728 | 80.96 |
| 25.5 | 2,083,992 | 58,872 | 0.0282 | 0.9718 | 78.75 |
| 26.5 | 1,949,912 | 39,150 | 0.0201 | 0.9799 | 76.53 |
| 27.5 | 1,796,026 | 29,172 | 0.0162 | 0.9838 | 74.99 |
| 28.5 | 1,730,649 | 91,004 | 0.0526 | 0.9474 | 73.77 |
| 29.5 | 1,639,645 | 22,151 | 0.0135 | 0.9865 | 69.89 |
| 30.5 | 1,617,494 | 17,783 | 0.0110 | 0.9890 | 68.95 |
| 31.5 | 1,433,255 | 107,523 | 0.0750 | 0.9250 | 68.19 |
| 32.5 | 1,269,188 | 1,504 | 0.0012 | 0.9988 | 63.08 |
| 33.5 | 1,114,126 | | 0.0000 | 1.0000 | 63.00 |
| 34.5 | 1,114,126 | 9,569 | 0.0086 | 0.9914 | 63.00 |
| 35.5 | 876,987 | 23,423 | 0.0267 | 0.9733 | 62.46 |
| 36.5 | 811,553 | | 0.0000 | 1.0000 | 60.79 |
| 37.5 | 749,163 | | 0.0000 | 1.0000 | 60.79 |
| 38.5 | 610,688 | 47,584 | 0.0779 | 0.9221 | 60.79 |

NEWFOUNDLAND AND LABRADOR HYDRO

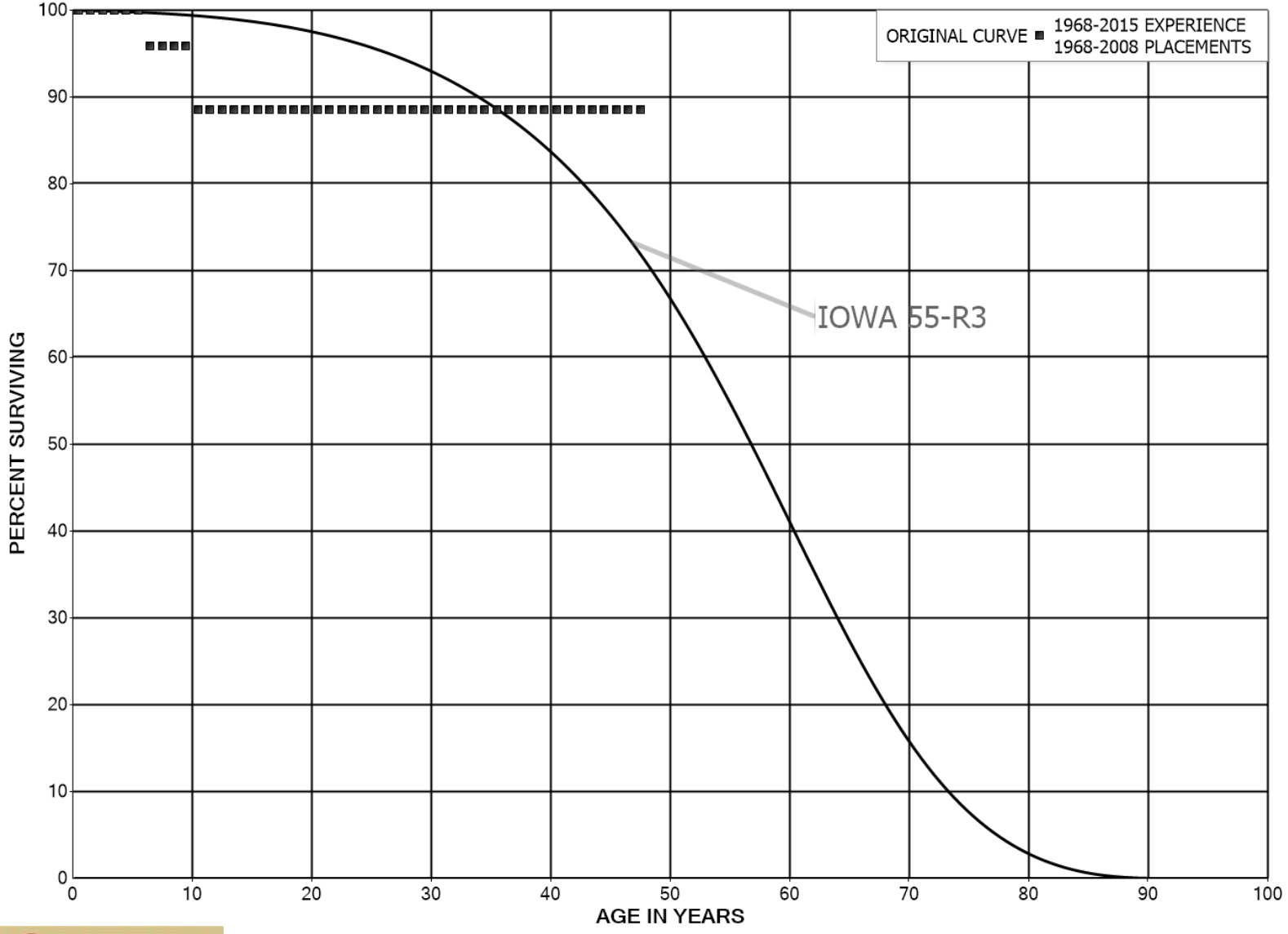
ACCOUNT C10 - COMPRESSED AIR SYSTEMS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 521,153 | 4,512 | 0.0087 | 0.9913 | 56.06 |
| 40.5 | 506,641 | 18,589 | 0.0367 | 0.9633 | 55.57 |
| 41.5 | 391,903 | | 0.0000 | 1.0000 | 53.53 |
| 42.5 | 391,903 | | 0.0000 | 1.0000 | 53.53 |
| 43.5 | 391,903 | 25,370 | 0.0647 | 0.9353 | 53.53 |
| 44.5 | 251,208 | 8,181 | 0.0326 | 0.9674 | 50.07 |
| 45.5 | 237,023 | | 0.0000 | 1.0000 | 48.44 |
| 46.5 | 195,996 | 5,167 | 0.0264 | 0.9736 | 48.44 |
| 47.5 | 170,490 | | 0.0000 | 1.0000 | 47.16 |
| 48.5 | 36,402 | | 0.0000 | 1.0000 | 47.16 |
| 49.5 | | | | | 47.16 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C12 - CONDENSERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C12 - CONDENSERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2008 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 2,754,393 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 2,754,393 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 2,754,393 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 2,754,393 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 2,754,393 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 2,754,393 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 2,754,393 | 113,499 | 0.0412 | 0.9588 | 100.00 |
| 6.5 | 2,640,894 | | 0.0000 | 1.0000 | 95.88 |
| 7.5 | 2,405,299 | | 0.0000 | 1.0000 | 95.88 |
| 8.5 | 2,405,299 | | 0.0000 | 1.0000 | 95.88 |
| 9.5 | 2,405,299 | 185,297 | 0.0770 | 0.9230 | 95.88 |
| 10.5 | 2,220,002 | | 0.0000 | 1.0000 | 88.49 |
| 11.5 | 2,220,002 | | 0.0000 | 1.0000 | 88.49 |
| 12.5 | 2,220,002 | | 0.0000 | 1.0000 | 88.49 |
| 13.5 | 2,220,002 | | 0.0000 | 1.0000 | 88.49 |
| 14.5 | 2,220,002 | | 0.0000 | 1.0000 | 88.49 |
| 15.5 | 2,220,002 | | 0.0000 | 1.0000 | 88.49 |
| 16.5 | 2,220,002 | | 0.0000 | 1.0000 | 88.49 |
| 17.5 | 2,220,002 | | 0.0000 | 1.0000 | 88.49 |
| 18.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 19.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 20.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 21.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 22.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 23.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 24.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 25.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 26.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 27.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 28.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 29.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 30.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 31.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 32.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 33.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 34.5 | 2,168,448 | | 0.0000 | 1.0000 | 88.49 |
| 35.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 36.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 37.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 38.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |

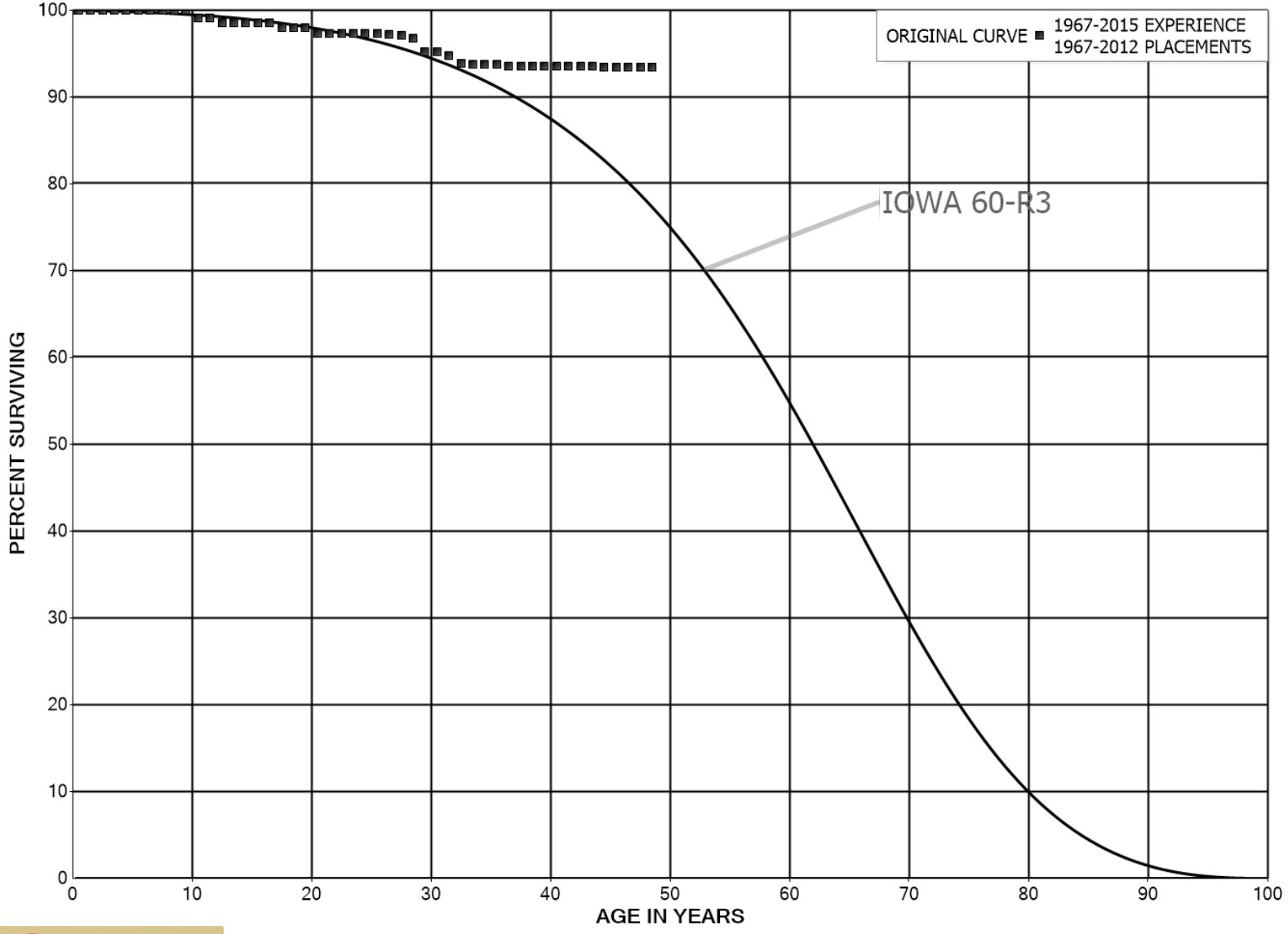
NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C12 - CONDENSERS

ORIGINAL LIFE TABLE, CONT.

| PLACEMENT BAND 1968-2008 | | | EXPERIENCE BAND 1968-2015 | | |
|---|---|---|---|---|---|
| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
| 39.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 40.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 41.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 42.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 43.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 44.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 45.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 46.5 | 125,930 | | 0.0000 | 1.0000 | 88.49 |
| 47.5 | | | | | 88.49 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C13 - CONDUCTOR
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C13 - CONDUCTOR

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2012 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 70,480,775 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 70,480,775 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 70,480,775 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 70,480,775 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 70,181,749 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 70,181,749 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 70,181,749 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 70,069,982 | 67,979 | 0.0010 | 0.9990 | 100.00 |
| 7.5 | 70,002,002 | | 0.0000 | 1.0000 | 99.90 |
| 8.5 | 70,002,002 | | 0.0000 | 1.0000 | 99.90 |
| 9.5 | 69,296,481 | 578,547 | 0.0083 | 0.9917 | 99.90 |
| 10.5 | 68,717,933 | 26,504 | 0.0004 | 0.9996 | 99.07 |
| 11.5 | 68,257,032 | 370,056 | 0.0054 | 0.9946 | 99.03 |
| 12.5 | 67,665,869 | 12,891 | 0.0002 | 0.9998 | 98.49 |
| 13.5 | 65,058,158 | | 0.0000 | 1.0000 | 98.48 |
| 14.5 | 62,746,193 | | 0.0000 | 1.0000 | 98.48 |
| 15.5 | 59,738,827 | | 0.0000 | 1.0000 | 98.48 |
| 16.5 | 59,717,138 | 285,994 | 0.0048 | 0.9952 | 98.48 |
| 17.5 | 57,857,546 | 63,133 | 0.0011 | 0.9989 | 98.00 |
| 18.5 | 56,648,660 | | 0.0000 | 1.0000 | 97.90 |
| 19.5 | 55,424,640 | 341,068 | 0.0062 | 0.9938 | 97.90 |
| 20.5 | 53,661,174 | | 0.0000 | 1.0000 | 97.29 |
| 21.5 | 53,600,351 | | 0.0000 | 1.0000 | 97.29 |
| 22.5 | 53,558,762 | | 0.0000 | 1.0000 | 97.29 |
| 23.5 | 53,558,762 | 14,600 | 0.0003 | 0.9997 | 97.29 |
| 24.5 | 53,458,029 | 990 | 0.0000 | 1.0000 | 97.27 |
| 25.5 | 42,935,498 | 25,135 | 0.0006 | 0.9994 | 97.27 |
| 26.5 | 42,910,364 | 85,533 | 0.0020 | 0.9980 | 97.21 |
| 27.5 | 41,350,890 | 119,028 | 0.0029 | 0.9971 | 97.02 |
| 28.5 | 38,513,640 | 625,623 | 0.0162 | 0.9838 | 96.74 |
| 29.5 | 37,888,017 | | 0.0000 | 1.0000 | 95.16 |
| 30.5 | 32,483,669 | 133,501 | 0.0041 | 0.9959 | 95.16 |
| 31.5 | 32,302,920 | 324,580 | 0.0100 | 0.9900 | 94.77 |
| 32.5 | 25,980,143 | 24,442 | 0.0009 | 0.9991 | 93.82 |
| 33.5 | 22,557,226 | | 0.0000 | 1.0000 | 93.73 |
| 34.5 | 18,394,525 | | 0.0000 | 1.0000 | 93.73 |
| 35.5 | 18,213,456 | 53,158 | 0.0029 | 0.9971 | 93.73 |
| 36.5 | 18,160,298 | | 0.0000 | 1.0000 | 93.46 |
| 37.5 | 13,235,211 | | 0.0000 | 1.0000 | 93.46 |
| 38.5 | 10,190,032 | | 0.0000 | 1.0000 | 93.46 |

NEWFOUNDLAND AND LABRADOR HYDRO

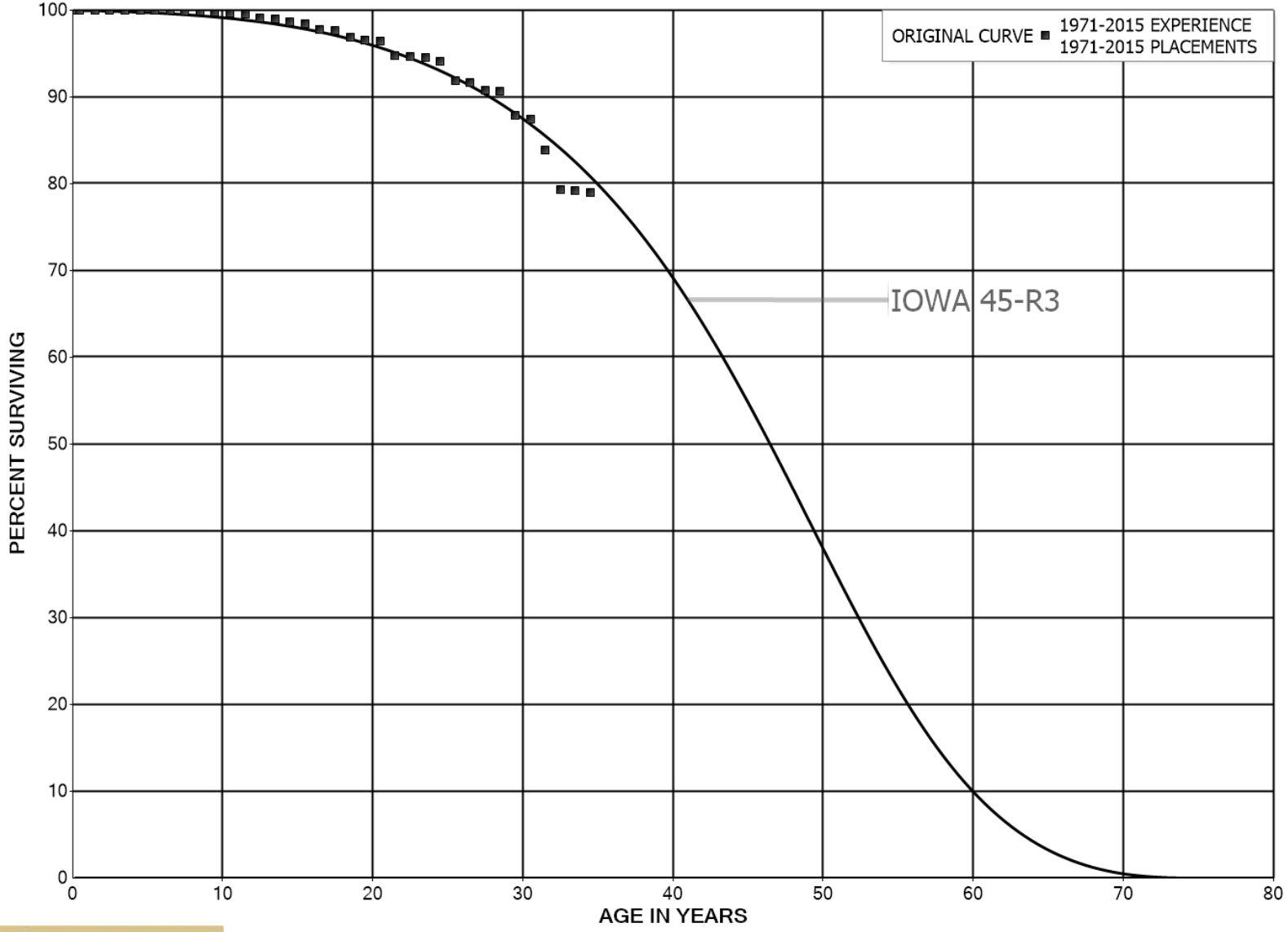
ACCOUNT C13 - CONDUCTOR

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2012 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 10,074,089 | | 0.0000 | 1.0000 | 93.46 |
| 40.5 | 10,074,089 | | 0.0000 | 1.0000 | 93.46 |
| 41.5 | 8,354,258 | | 0.0000 | 1.0000 | 93.46 |
| 42.5 | 8,354,258 | | 0.0000 | 1.0000 | 93.46 |
| 43.5 | 8,354,258 | 5,238 | 0.0006 | 0.9994 | 93.46 |
| 44.5 | 8,349,019 | | 0.0000 | 1.0000 | 93.40 |
| 45.5 | 7,575,829 | | 0.0000 | 1.0000 | 93.40 |
| 46.5 | 7,323,183 | | 0.0000 | 1.0000 | 93.40 |
| 47.5 | 4,914,311 | | 0.0000 | 1.0000 | 93.40 |
| 48.5 | | | | | 93.40 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C14 - CONDUCTOR - DISTRIBUTION
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C14 - CONDUCTOR - DISTRIBUTION

ORIGINAL LIFE TABLE

PLACEMENT BAND 1971-2015 EXPERIENCE BAND 1971-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 36,819,940 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 35,645,992 | 479 | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 33,936,800 | 544 | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 31,408,042 | 1,531 | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 29,890,463 | 4,045 | 0.0001 | 0.9999 | 99.99 |
| 4.5 | 29,206,735 | 8,981 | 0.0003 | 0.9997 | 99.98 |
| 5.5 | 28,940,399 | 13,474 | 0.0005 | 0.9995 | 99.95 |
| 6.5 | 28,226,144 | 4,465 | 0.0002 | 0.9998 | 99.90 |
| 7.5 | 27,708,336 | 25,140 | 0.0009 | 0.9991 | 99.89 |
| 8.5 | 27,179,759 | 16,412 | 0.0006 | 0.9994 | 99.79 |
| 9.5 | 26,327,109 | 18,031 | 0.0007 | 0.9993 | 99.73 |
| 10.5 | 26,097,119 | 33,970 | 0.0013 | 0.9987 | 99.67 |
| 11.5 | 25,761,069 | 122,738 | 0.0048 | 0.9952 | 99.54 |
| 12.5 | 25,181,970 | 33,062 | 0.0013 | 0.9987 | 99.06 |
| 13.5 | 21,302,356 | 59,365 | 0.0028 | 0.9972 | 98.93 |
| 14.5 | 20,663,414 | 60,355 | 0.0029 | 0.9971 | 98.66 |
| 15.5 | 19,912,890 | 123,096 | 0.0062 | 0.9938 | 98.37 |
| 16.5 | 19,283,755 | 28,595 | 0.0015 | 0.9985 | 97.76 |
| 17.5 | 18,725,840 | 154,385 | 0.0082 | 0.9918 | 97.62 |
| 18.5 | 17,183,862 | 59,009 | 0.0034 | 0.9966 | 96.81 |
| 19.5 | 16,388,655 | 23,093 | 0.0014 | 0.9986 | 96.48 |
| 20.5 | 15,598,113 | 260,829 | 0.0167 | 0.9833 | 96.34 |
| 21.5 | 14,806,008 | 13,268 | 0.0009 | 0.9991 | 94.73 |
| 22.5 | 14,073,831 | 19,353 | 0.0014 | 0.9986 | 94.65 |
| 23.5 | 13,845,454 | 69,553 | 0.0050 | 0.9950 | 94.52 |
| 24.5 | 13,101,525 | 305,608 | 0.0233 | 0.9767 | 94.04 |
| 25.5 | 11,985,146 | 25,544 | 0.0021 | 0.9979 | 91.85 |
| 26.5 | 10,692,019 | 106,506 | 0.0100 | 0.9900 | 91.65 |
| 27.5 | 9,672,675 | 13,277 | 0.0014 | 0.9986 | 90.74 |
| 28.5 | 8,730,110 | 270,431 | 0.0310 | 0.9690 | 90.61 |
| 29.5 | 7,794,514 | 35,049 | 0.0045 | 0.9955 | 87.81 |
| 30.5 | 6,628,324 | 272,343 | 0.0411 | 0.9589 | 87.41 |
| 31.5 | 5,486,386 | 295,579 | 0.0539 | 0.9461 | 83.82 |
| 32.5 | 4,824,825 | 9,868 | 0.0020 | 0.9980 | 79.31 |
| 33.5 | 4,490,644 | 11,911 | 0.0027 | 0.9973 | 79.14 |
| 34.5 | 684,485 | | 0.0000 | 1.0000 | 78.93 |
| 35.5 | 4,409 | | 0.0000 | 1.0000 | 78.93 |
| 36.5 | 4,409 | | 0.0000 | 1.0000 | 78.93 |
| 37.5 | 4,409 | | 0.0000 | 1.0000 | 78.93 |
| 38.5 | 3,753 | | 0.0000 | 1.0000 | 78.93 |

NEWFOUNDLAND AND LABRADOR HYDRO

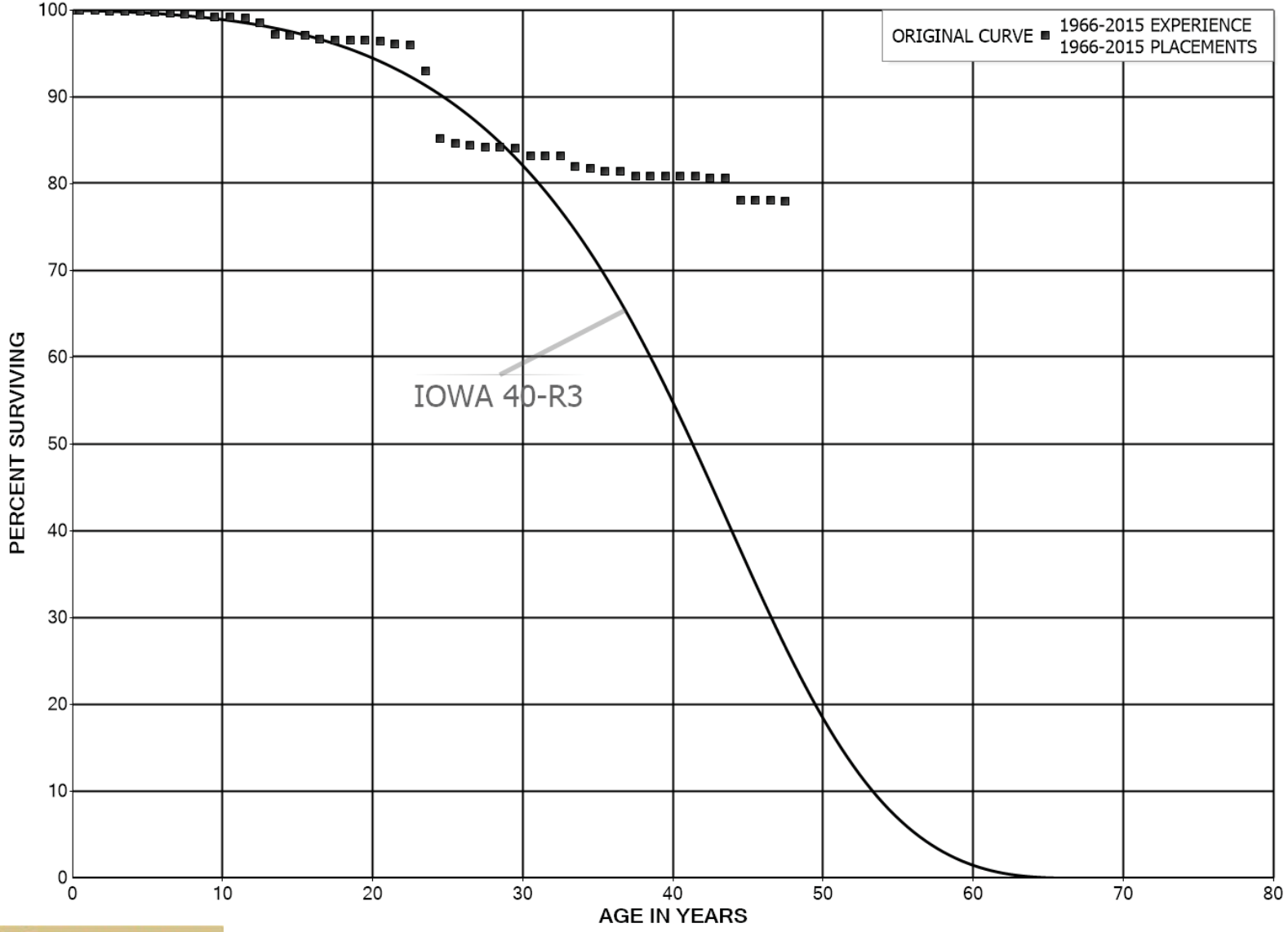
ACCOUNT C14 - CONDUCTOR - DISTRIBUTION

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1971-2015 EXPERIENCE BAND 1971-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 3,753 | | 0.0000 | 1.0000 | 78.93 |
| 40.5 | 3,753 | | 0.0000 | 1.0000 | 78.93 |
| 41.5 | 3,753 | | 0.0000 | 1.0000 | 78.93 |
| 42.5 | 3,753 | | 0.0000 | 1.0000 | 78.93 |
| 43.5 | 3,753 | | 0.0000 | 1.0000 | 78.93 |
| 44.5 | | | | | 78.93 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C15 - CONTROL, METER / RELAYING
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C15 - CONTROL, METER / RELAYING

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 32,359,950 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 25,771,532 | 13,320 | 0.0005 | 0.9995 | 100.00 |
| 1.5 | 25,058,141 | 34,993 | 0.0014 | 0.9986 | 99.95 |
| 2.5 | 24,421,940 | | 0.0000 | 1.0000 | 99.81 |
| 3.5 | 23,172,790 | 6,163 | 0.0003 | 0.9997 | 99.81 |
| 4.5 | 22,753,741 | 788 | 0.0000 | 1.0000 | 99.78 |
| 5.5 | 22,213,253 | 44,781 | 0.0020 | 0.9980 | 99.78 |
| 6.5 | 21,274,185 | 12,423 | 0.0006 | 0.9994 | 99.58 |
| 7.5 | 21,038,684 | 25,993 | 0.0012 | 0.9988 | 99.52 |
| 8.5 | 20,930,332 | 51,041 | 0.0024 | 0.9976 | 99.40 |
| 9.5 | 20,469,755 | | 0.0000 | 1.0000 | 99.15 |
| 10.5 | 20,042,613 | 10,665 | 0.0005 | 0.9995 | 99.15 |
| 11.5 | 19,586,316 | 111,002 | 0.0057 | 0.9943 | 99.10 |
| 12.5 | 19,028,560 | 268,994 | 0.0141 | 0.9859 | 98.54 |
| 13.5 | 18,520,510 | 10,359 | 0.0006 | 0.9994 | 97.15 |
| 14.5 | 17,559,692 | 9,026 | 0.0005 | 0.9995 | 97.09 |
| 15.5 | 16,727,758 | 80,152 | 0.0048 | 0.9952 | 97.04 |
| 16.5 | 16,117,217 | 13,444 | 0.0008 | 0.9992 | 96.58 |
| 17.5 | 15,372,825 | | 0.0000 | 1.0000 | 96.50 |
| 18.5 | 14,807,238 | | 0.0000 | 1.0000 | 96.50 |
| 19.5 | 14,402,480 | 13,424 | 0.0009 | 0.9991 | 96.50 |
| 20.5 | 13,323,080 | 45,052 | 0.0034 | 0.9966 | 96.41 |
| 21.5 | 12,679,908 | 18,113 | 0.0014 | 0.9986 | 96.08 |
| 22.5 | 12,475,358 | 395,390 | 0.0317 | 0.9683 | 95.94 |
| 23.5 | 10,815,343 | 903,684 | 0.0836 | 0.9164 | 92.90 |
| 24.5 | 9,593,893 | 55,378 | 0.0058 | 0.9942 | 85.14 |
| 25.5 | 8,683,391 | 30,154 | 0.0035 | 0.9965 | 84.65 |
| 26.5 | 8,180,693 | 13,142 | 0.0016 | 0.9984 | 84.35 |
| 27.5 | 7,887,390 | 2,980 | 0.0004 | 0.9996 | 84.22 |
| 28.5 | 7,515,959 | 12,667 | 0.0017 | 0.9983 | 84.19 |
| 29.5 | 7,143,772 | 74,334 | 0.0104 | 0.9896 | 84.05 |
| 30.5 | 6,816,996 | 3,704 | 0.0005 | 0.9995 | 83.17 |
| 31.5 | 6,712,760 | | 0.0000 | 1.0000 | 83.13 |
| 32.5 | 6,324,697 | 88,202 | 0.0139 | 0.9861 | 83.13 |
| 33.5 | 5,577,905 | 15,672 | 0.0028 | 0.9972 | 81.97 |
| 34.5 | 5,391,777 | 21,753 | 0.0040 | 0.9960 | 81.74 |
| 35.5 | 4,914,807 | | 0.0000 | 1.0000 | 81.41 |
| 36.5 | 4,538,826 | 33,134 | 0.0073 | 0.9927 | 81.41 |
| 37.5 | 4,132,037 | | 0.0000 | 1.0000 | 80.81 |
| 38.5 | 3,885,274 | | 0.0000 | 1.0000 | 80.81 |

NEWFOUNDLAND AND LABRADOR HYDRO

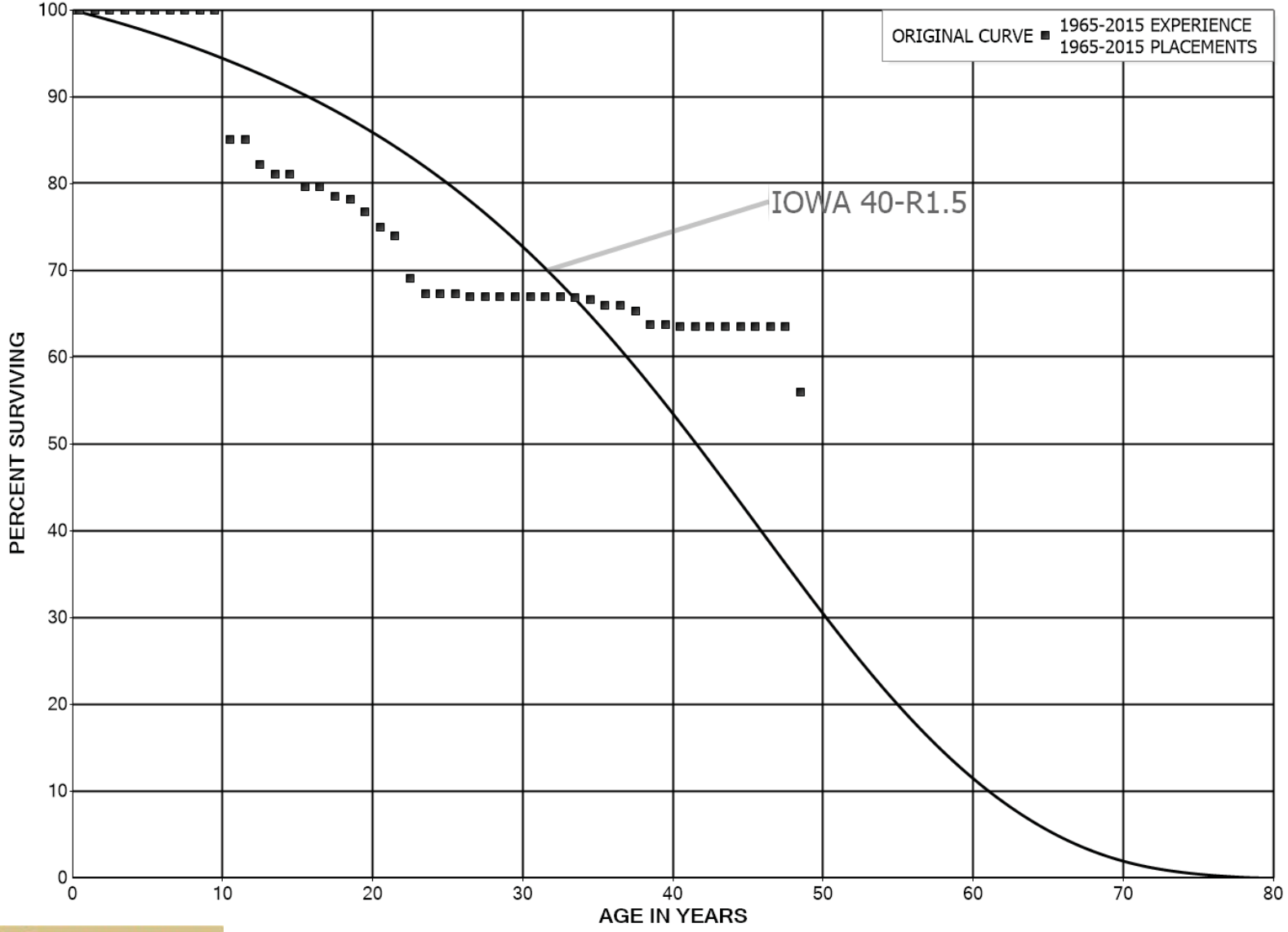
ACCOUNT C15 - CONTROL, METER / RELAYING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 3,869,706 | | 0.0000 | 1.0000 | 80.81 |
| 40.5 | 3,268,599 | | 0.0000 | 1.0000 | 80.81 |
| 41.5 | 3,147,635 | 6,881 | 0.0022 | 0.9978 | 80.81 |
| 42.5 | 3,140,755 | | 0.0000 | 1.0000 | 80.64 |
| 43.5 | 3,140,755 | 99,116 | 0.0316 | 0.9684 | 80.64 |
| 44.5 | 3,041,639 | | 0.0000 | 1.0000 | 78.09 |
| 45.5 | 2,507,838 | | 0.0000 | 1.0000 | 78.09 |
| 46.5 | 2,492,160 | 6,399 | 0.0026 | 0.9974 | 78.09 |
| 47.5 | 2,298,558 | 62,541 | 0.0272 | 0.9728 | 77.89 |
| 48.5 | 36,521 | | 0.0000 | 1.0000 | 75.77 |
| 49.5 | | | | | 75.77 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C16 - COOLING SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C16 - COOLING SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 11,150,185 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 7,898,071 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 7,340,820 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 5,631,985 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 5,615,933 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 5,169,926 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 4,821,164 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 4,340,913 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 3,999,987 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 3,920,744 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 3,785,623 | 566,030 | 0.1495 | 0.8505 | 100.00 |
| 10.5 | 3,190,712 | | 0.0000 | 1.0000 | 85.05 |
| 11.5 | 3,190,712 | 106,045 | 0.0332 | 0.9668 | 85.05 |
| 12.5 | 2,998,348 | 42,775 | 0.0143 | 0.9857 | 82.22 |
| 13.5 | 2,916,218 | | 0.0000 | 1.0000 | 81.05 |
| 14.5 | 2,916,218 | 51,412 | 0.0176 | 0.9824 | 81.05 |
| 15.5 | 2,712,372 | | 0.0000 | 1.0000 | 79.62 |
| 16.5 | 2,605,704 | 36,863 | 0.0141 | 0.9859 | 79.62 |
| 17.5 | 2,255,278 | 7,884 | 0.0035 | 0.9965 | 78.49 |
| 18.5 | 2,247,395 | 42,898 | 0.0191 | 0.9809 | 78.22 |
| 19.5 | 2,204,497 | 50,693 | 0.0230 | 0.9770 | 76.73 |
| 20.5 | 1,991,939 | 27,142 | 0.0136 | 0.9864 | 74.96 |
| 21.5 | 1,612,007 | 107,059 | 0.0664 | 0.9336 | 73.94 |
| 22.5 | 1,495,645 | 36,960 | 0.0247 | 0.9753 | 69.03 |
| 23.5 | 1,420,769 | | 0.0000 | 1.0000 | 67.32 |
| 24.5 | 1,420,769 | | 0.0000 | 1.0000 | 67.32 |
| 25.5 | 1,420,769 | 8,192 | 0.0058 | 0.9942 | 67.32 |
| 26.5 | 1,283,107 | | 0.0000 | 1.0000 | 66.94 |
| 27.5 | 1,250,535 | | 0.0000 | 1.0000 | 66.94 |
| 28.5 | 1,250,535 | | 0.0000 | 1.0000 | 66.94 |
| 29.5 | 1,250,535 | | 0.0000 | 1.0000 | 66.94 |
| 30.5 | 1,250,535 | | 0.0000 | 1.0000 | 66.94 |
| 31.5 | 1,001,226 | | 0.0000 | 1.0000 | 66.94 |
| 32.5 | 992,289 | 1,500 | 0.0015 | 0.9985 | 66.94 |
| 33.5 | 824,036 | 3,274 | 0.0040 | 0.9960 | 66.83 |
| 34.5 | 795,673 | 7,916 | 0.0099 | 0.9901 | 66.57 |
| 35.5 | 761,282 | | 0.0000 | 1.0000 | 65.91 |
| 36.5 | 623,479 | 6,231 | 0.0100 | 0.9900 | 65.91 |
| 37.5 | 617,248 | 14,120 | 0.0229 | 0.9771 | 65.25 |
| 38.5 | 319,207 | | 0.0000 | 1.0000 | 63.76 |

NEWFOUNDLAND AND LABRADOR HYDRO

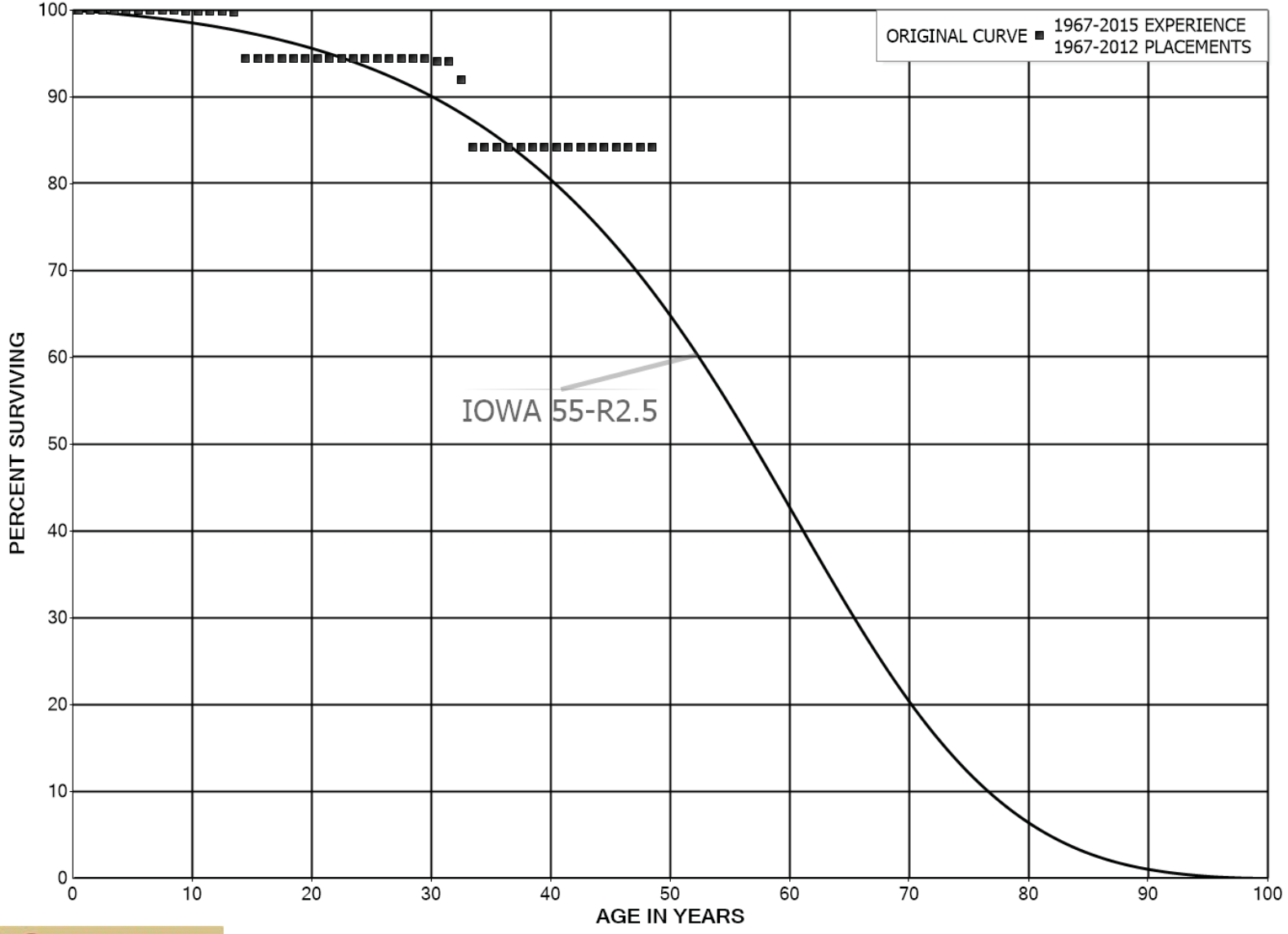
ACCOUNT C16 - COOLING SYSTEMS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 319,207 | 1,155 | 0.0036 | 0.9964 | 63.76 |
| 40.5 | 318,052 | | 0.0000 | 1.0000 | 63.52 |
| 41.5 | 318,052 | | 0.0000 | 1.0000 | 63.52 |
| 42.5 | 298,713 | | 0.0000 | 1.0000 | 63.52 |
| 43.5 | 298,713 | | 0.0000 | 1.0000 | 63.52 |
| 44.5 | 262,697 | | 0.0000 | 1.0000 | 63.52 |
| 45.5 | 262,697 | | 0.0000 | 1.0000 | 63.52 |
| 46.5 | 213,556 | | 0.0000 | 1.0000 | 63.52 |
| 47.5 | 210,322 | 25,000 | 0.1189 | 0.8811 | 63.52 |
| 48.5 | 185,322 | | 0.0000 | 1.0000 | 55.97 |
| 49.5 | 49,715 | | 0.0000 | 1.0000 | 55.97 |
| 50.5 | | | | | 55.97 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C17 - COUNTERPOISE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C17 - COUNTERPOISE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2012 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 3,915,332 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 3,915,332 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 3,915,332 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 3,915,332 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 3,871,953 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 3,871,953 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 3,871,953 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 3,871,953 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 3,871,953 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 3,871,953 | 5,928 | 0.0015 | 0.9985 | 100.00 |
| 9.5 | 3,866,025 | | 0.0000 | 1.0000 | 99.85 |
| 10.5 | 3,866,025 | | 0.0000 | 1.0000 | 99.85 |
| 11.5 | 3,866,025 | | 0.0000 | 1.0000 | 99.85 |
| 12.5 | 3,513,115 | 5,192 | 0.0015 | 0.9985 | 99.85 |
| 13.5 | 3,326,719 | 176,142 | 0.0529 | 0.9471 | 99.70 |
| 14.5 | 2,933,725 | | 0.0000 | 1.0000 | 94.42 |
| 15.5 | 2,652,937 | | 0.0000 | 1.0000 | 94.42 |
| 16.5 | 2,649,779 | | 0.0000 | 1.0000 | 94.42 |
| 17.5 | 2,649,779 | | 0.0000 | 1.0000 | 94.42 |
| 18.5 | 2,601,336 | | 0.0000 | 1.0000 | 94.42 |
| 19.5 | 2,583,450 | | 0.0000 | 1.0000 | 94.42 |
| 20.5 | 2,564,439 | | 0.0000 | 1.0000 | 94.42 |
| 21.5 | 2,233,040 | | 0.0000 | 1.0000 | 94.42 |
| 22.5 | 1,867,771 | | 0.0000 | 1.0000 | 94.42 |
| 23.5 | 1,705,947 | | 0.0000 | 1.0000 | 94.42 |
| 24.5 | 1,705,388 | | 0.0000 | 1.0000 | 94.42 |
| 25.5 | 1,671,216 | | 0.0000 | 1.0000 | 94.42 |
| 26.5 | 1,523,554 | | 0.0000 | 1.0000 | 94.42 |
| 27.5 | 1,308,437 | | 0.0000 | 1.0000 | 94.42 |
| 28.5 | 1,297,319 | | 0.0000 | 1.0000 | 94.42 |
| 29.5 | 1,190,515 | 4,514 | 0.0038 | 0.9962 | 94.42 |
| 30.5 | 971,350 | | 0.0000 | 1.0000 | 94.06 |
| 31.5 | 971,350 | 21,504 | 0.0221 | 0.9779 | 94.06 |
| 32.5 | 934,320 | 78,963 | 0.0845 | 0.9155 | 91.98 |
| 33.5 | 827,814 | | 0.0000 | 1.0000 | 84.21 |
| 34.5 | 818,308 | | 0.0000 | 1.0000 | 84.21 |
| 35.5 | 818,308 | | 0.0000 | 1.0000 | 84.21 |
| 36.5 | 818,308 | | 0.0000 | 1.0000 | 84.21 |
| 37.5 | 694,989 | | 0.0000 | 1.0000 | 84.21 |
| 38.5 | 694,989 | | 0.0000 | 1.0000 | 84.21 |

NEWFOUNDLAND AND LABRADOR HYDRO

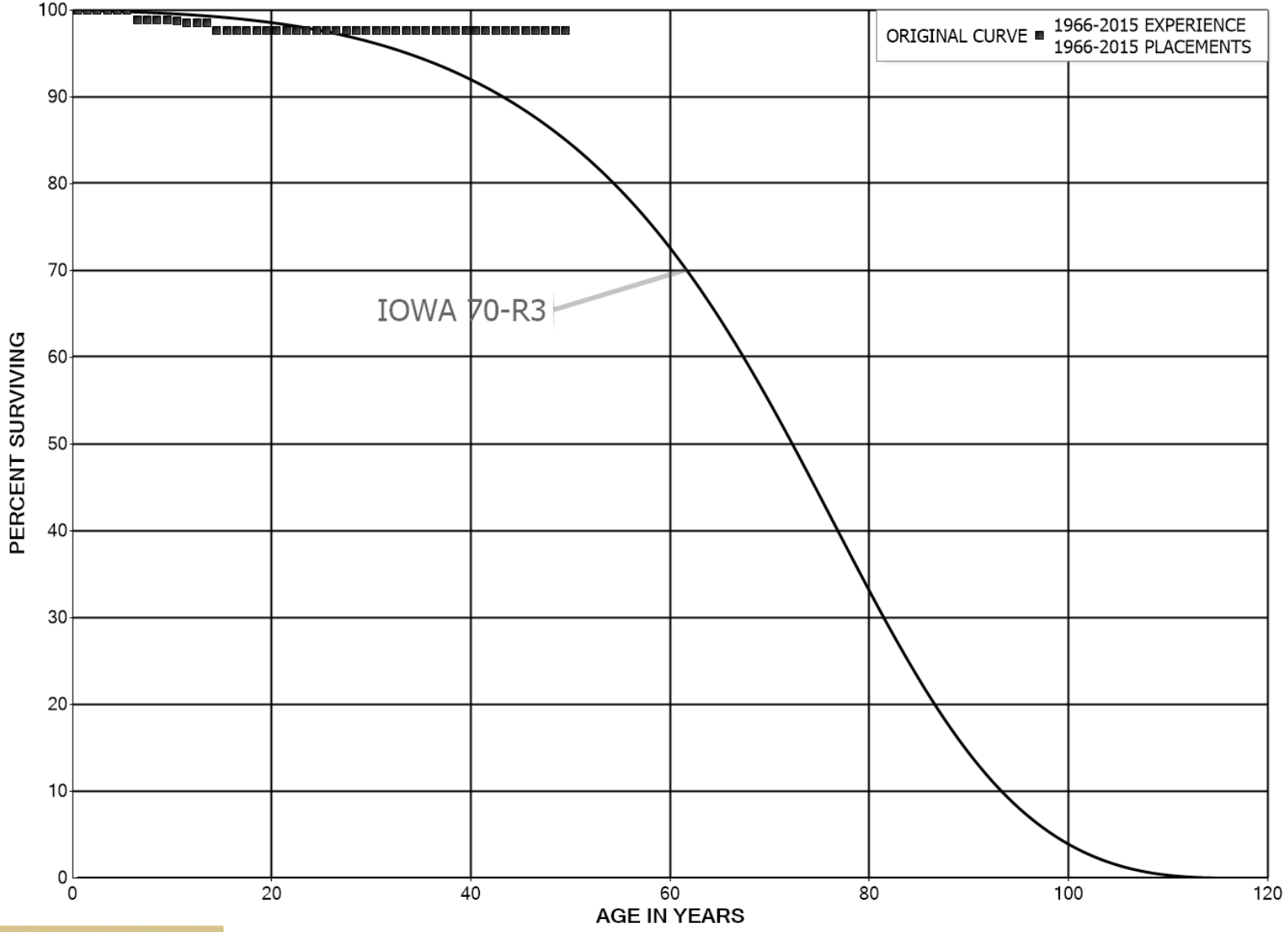
ACCOUNT C17 - COUNTERPOISE

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2012 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 694,989 | | 0.0000 | 1.0000 | 84.21 |
| 40.5 | 694,989 | | 0.0000 | 1.0000 | 84.21 |
| 41.5 | 679,437 | | 0.0000 | 1.0000 | 84.21 |
| 42.5 | 679,437 | | 0.0000 | 1.0000 | 84.21 |
| 43.5 | 679,437 | | 0.0000 | 1.0000 | 84.21 |
| 44.5 | 679,437 | | 0.0000 | 1.0000 | 84.21 |
| 45.5 | 678,891 | | 0.0000 | 1.0000 | 84.21 |
| 46.5 | 678,891 | | 0.0000 | 1.0000 | 84.21 |
| 47.5 | 431,098 | | 0.0000 | 1.0000 | 84.21 |
| 48.5 | | | | | 84.21 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT C18 - CRANES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C18 - CRANES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 7,041,523 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 7,028,081 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 6,964,914 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 6,749,075 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 6,749,075 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 6,605,709 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 6,605,709 | 75,734 | 0.0115 | 0.9885 | 100.00 |
| 6.5 | 6,529,974 | | 0.0000 | 1.0000 | 98.85 |
| 7.5 | 6,514,785 | | 0.0000 | 1.0000 | 98.85 |
| 8.5 | 6,514,785 | | 0.0000 | 1.0000 | 98.85 |
| 9.5 | 6,420,884 | 4,823 | 0.0008 | 0.9992 | 98.85 |
| 10.5 | 6,416,061 | 16,543 | 0.0026 | 0.9974 | 98.78 |
| 11.5 | 6,399,518 | | 0.0000 | 1.0000 | 98.52 |
| 12.5 | 4,839,368 | | 0.0000 | 1.0000 | 98.52 |
| 13.5 | 4,830,953 | 42,281 | 0.0088 | 0.9912 | 98.52 |
| 14.5 | 4,788,672 | | 0.0000 | 1.0000 | 97.66 |
| 15.5 | 4,788,672 | | 0.0000 | 1.0000 | 97.66 |
| 16.5 | 4,788,672 | | 0.0000 | 1.0000 | 97.66 |
| 17.5 | 4,788,672 | | 0.0000 | 1.0000 | 97.66 |
| 18.5 | 4,788,672 | | 0.0000 | 1.0000 | 97.66 |
| 19.5 | 4,782,465 | | 0.0000 | 1.0000 | 97.66 |
| 20.5 | 4,778,683 | | 0.0000 | 1.0000 | 97.66 |
| 21.5 | 4,778,683 | | 0.0000 | 1.0000 | 97.66 |
| 22.5 | 4,763,241 | | 0.0000 | 1.0000 | 97.66 |
| 23.5 | 4,763,241 | | 0.0000 | 1.0000 | 97.66 |
| 24.5 | 4,763,241 | | 0.0000 | 1.0000 | 97.66 |
| 25.5 | 4,763,241 | | 0.0000 | 1.0000 | 97.66 |
| 26.5 | 4,739,441 | | 0.0000 | 1.0000 | 97.66 |
| 27.5 | 4,434,835 | | 0.0000 | 1.0000 | 97.66 |
| 28.5 | 4,434,835 | | 0.0000 | 1.0000 | 97.66 |
| 29.5 | 4,434,835 | | 0.0000 | 1.0000 | 97.66 |
| 30.5 | 4,311,217 | | 0.0000 | 1.0000 | 97.66 |
| 31.5 | 3,317,260 | | 0.0000 | 1.0000 | 97.66 |
| 32.5 | 3,317,260 | | 0.0000 | 1.0000 | 97.66 |
| 33.5 | 1,815,849 | | 0.0000 | 1.0000 | 97.66 |
| 34.5 | 1,815,849 | | 0.0000 | 1.0000 | 97.66 |
| 35.5 | 1,679,562 | | 0.0000 | 1.0000 | 97.66 |
| 36.5 | 1,081,985 | | 0.0000 | 1.0000 | 97.66 |
| 37.5 | 1,081,985 | | 0.0000 | 1.0000 | 97.66 |
| 38.5 | 1,081,985 | | 0.0000 | 1.0000 | 97.66 |

NEWFOUNDLAND AND LABRADOR HYDRO

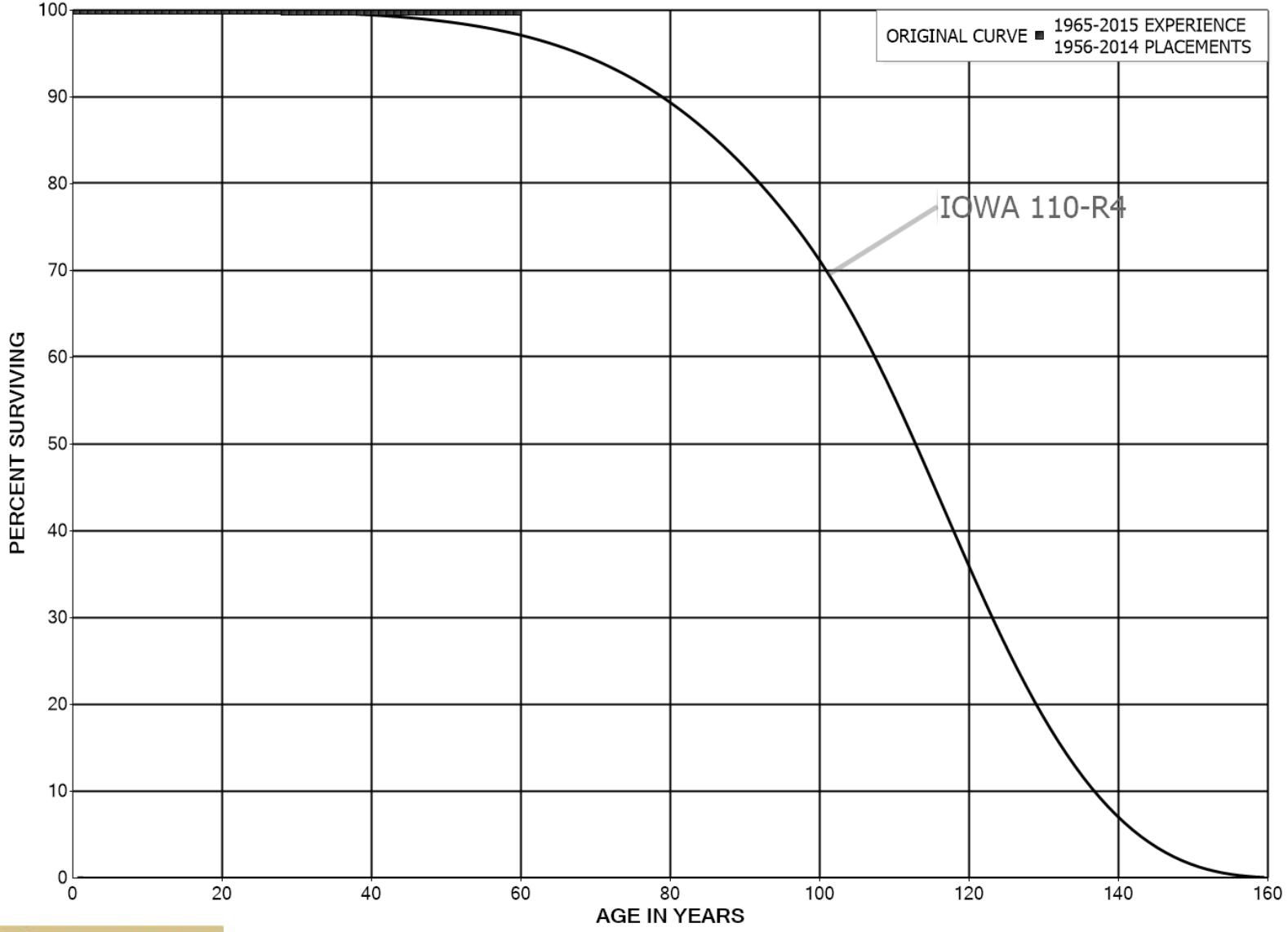
ACCOUNT C18 - CRANES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 1,081,985 | | 0.0000 | 1.0000 | 97.66 |
| 40.5 | 1,081,985 | | 0.0000 | 1.0000 | 97.66 |
| 41.5 | 1,081,985 | | 0.0000 | 1.0000 | 97.66 |
| 42.5 | 1,081,985 | | 0.0000 | 1.0000 | 97.66 |
| 43.5 | 1,081,985 | | 0.0000 | 1.0000 | 97.66 |
| 44.5 | 1,081,985 | | 0.0000 | 1.0000 | 97.66 |
| 45.5 | 1,081,985 | | 0.0000 | 1.0000 | 97.66 |
| 46.5 | 847,978 | | 0.0000 | 1.0000 | 97.66 |
| 47.5 | 847,978 | | 0.0000 | 1.0000 | 97.66 |
| 48.5 | 658,978 | | 0.0000 | 1.0000 | 97.66 |
| 49.5 | | | | | 97.66 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT D01 - DAMS, DIKES, CANALS AND TUNNELS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT D01 - DAMS, DYKES, CANALS AND TUNNELS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1956-2014 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 361,974,611 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 361,974,611 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 361,816,305 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 361,816,305 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 360,513,319 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 360,513,319 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 360,016,433 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 359,312,256 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 359,312,256 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 359,927,562 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 359,927,562 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 357,064,279 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 357,064,279 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 328,845,243 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 328,845,243 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 328,845,243 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 328,845,243 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 328,845,243 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 328,845,243 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 328,845,243 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 328,845,243 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 328,845,243 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 328,845,243 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 328,840,531 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 328,802,521 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 328,802,521 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 328,802,521 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 328,299,433 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 316,297,101 | 677,266 | 0.0021 | 0.9979 | 100.00 |
| 28.5 | 315,619,835 | | 0.0000 | 1.0000 | 99.79 |
| 29.5 | 315,571,032 | | 0.0000 | 1.0000 | 99.79 |
| 30.5 | 304,575,473 | 134 | 0.0000 | 1.0000 | 99.79 |
| 31.5 | 191,450,701 | | 0.0000 | 1.0000 | 99.79 |
| 32.5 | 169,766,434 | | 0.0000 | 1.0000 | 99.79 |
| 33.5 | 114,996,228 | | 0.0000 | 1.0000 | 99.79 |
| 34.5 | 114,996,228 | | 0.0000 | 1.0000 | 99.79 |
| 35.5 | 106,262,617 | | 0.0000 | 1.0000 | 99.79 |
| 36.5 | 79,308,072 | | 0.0000 | 1.0000 | 99.79 |
| 37.5 | 75,663,686 | | 0.0000 | 1.0000 | 99.79 |
| 38.5 | 75,663,686 | | 0.0000 | 1.0000 | 99.79 |

NEWFOUNDLAND AND LABRADOR HYDRO

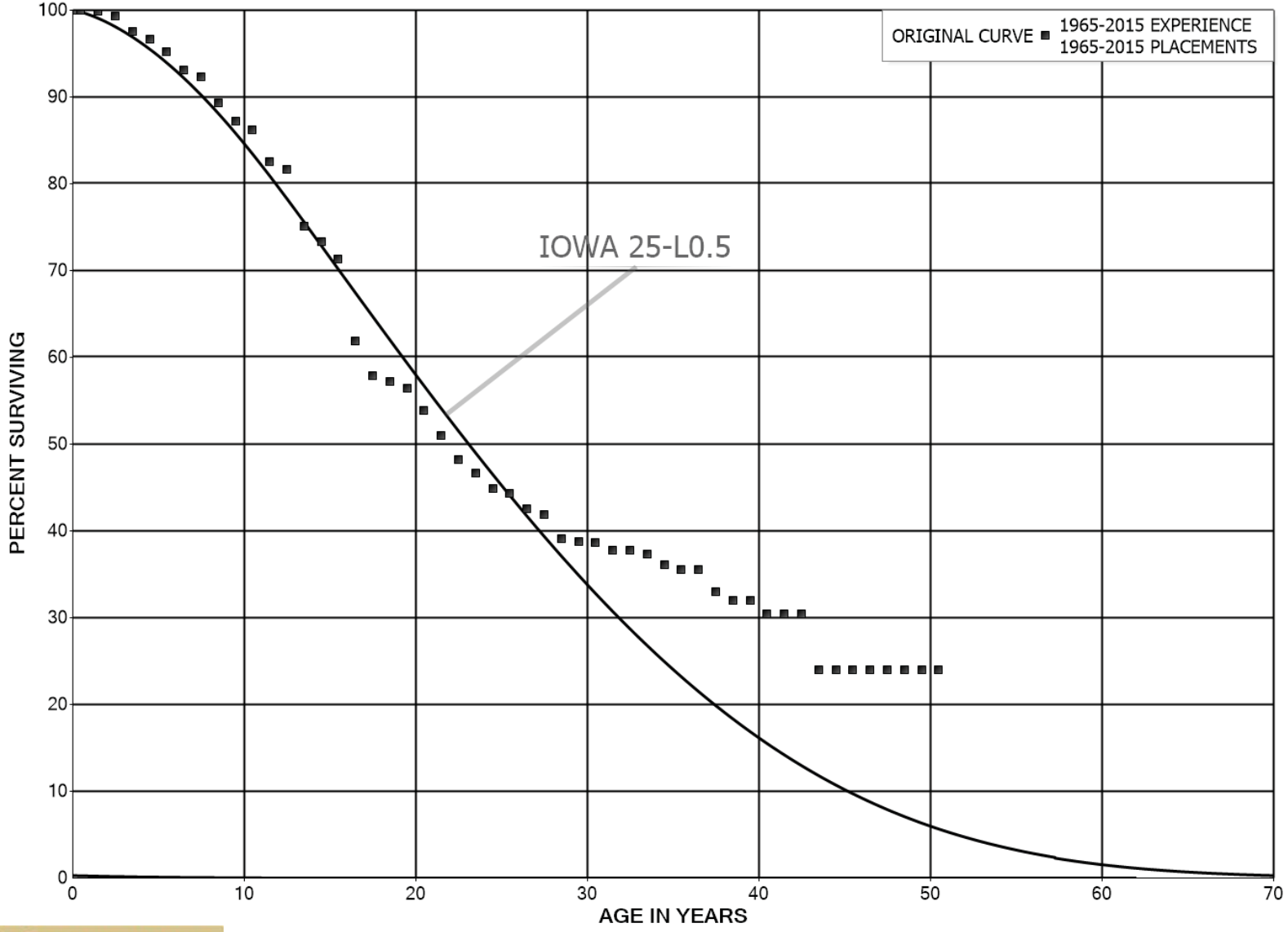
ACCOUNT D01 - DAMS, DIKES, CANALS AND TUNNELS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1956-2014 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 75,663,686 | | 0.0000 | 1.0000 | 99.79 |
| 40.5 | 75,663,686 | | 0.0000 | 1.0000 | 99.79 |
| 41.5 | 75,663,686 | | 0.0000 | 1.0000 | 99.79 |
| 42.5 | 75,663,686 | | 0.0000 | 1.0000 | 99.79 |
| 43.5 | 75,663,686 | | 0.0000 | 1.0000 | 99.79 |
| 44.5 | 75,663,686 | 3,146 | 0.0000 | 1.0000 | 99.79 |
| 45.5 | 70,760,716 | | 0.0000 | 1.0000 | 99.78 |
| 46.5 | 70,614,492 | | 0.0000 | 1.0000 | 99.78 |
| 47.5 | 70,614,492 | | 0.0000 | 1.0000 | 99.78 |
| 48.5 | 43,482,527 | 116 | 0.0000 | 1.0000 | 99.78 |
| 49.5 | 615,306 | | 0.0000 | 1.0000 | 99.78 |
| 50.5 | 615,306 | | 0.0000 | 1.0000 | 99.78 |
| 51.5 | 615,306 | | 0.0000 | 1.0000 | 99.78 |
| 52.5 | 615,306 | | 0.0000 | 1.0000 | 99.78 |
| 53.5 | 615,306 | | 0.0000 | 1.0000 | 99.78 |
| 54.5 | 615,306 | | 0.0000 | 1.0000 | 99.78 |
| 55.5 | 615,306 | | 0.0000 | 1.0000 | 99.78 |
| 56.5 | 615,306 | | 0.0000 | 1.0000 | 99.78 |
| 57.5 | 615,306 | | 0.0000 | 1.0000 | 99.78 |
| 58.5 | 615,306 | | 0.0000 | 1.0000 | 99.78 |
| 59.5 | | | | | 99.78 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT D02 - DIESEL SYSTEMS AND ENGINES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT D02 - DIESEL SYSTEMS AND ENGINES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 60,908,369 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 58,476,998 | 126,086 | 0.0022 | 0.9978 | 100.00 |
| 1.5 | 51,717,002 | 280,669 | 0.0054 | 0.9946 | 99.78 |
| 2.5 | 49,925,783 | 863,917 | 0.0173 | 0.9827 | 99.24 |
| 3.5 | 46,654,770 | 449,035 | 0.0096 | 0.9904 | 97.53 |
| 4.5 | 42,463,182 | 624,574 | 0.0147 | 0.9853 | 96.59 |
| 5.5 | 39,066,836 | 852,864 | 0.0218 | 0.9782 | 95.17 |
| 6.5 | 35,576,464 | 301,402 | 0.0085 | 0.9915 | 93.09 |
| 7.5 | 35,166,050 | 1,135,416 | 0.0323 | 0.9677 | 92.30 |
| 8.5 | 33,113,977 | 797,058 | 0.0241 | 0.9759 | 89.32 |
| 9.5 | 31,958,993 | 373,543 | 0.0117 | 0.9883 | 87.17 |
| 10.5 | 30,479,328 | 1,275,308 | 0.0418 | 0.9582 | 86.15 |
| 11.5 | 29,204,020 | 323,119 | 0.0111 | 0.9889 | 82.55 |
| 12.5 | 28,638,070 | 2,294,762 | 0.0801 | 0.9199 | 81.63 |
| 13.5 | 24,704,152 | 587,844 | 0.0238 | 0.9762 | 75.09 |
| 14.5 | 22,153,380 | 608,581 | 0.0275 | 0.9725 | 73.31 |
| 15.5 | 20,064,729 | 2,668,955 | 0.1330 | 0.8670 | 71.29 |
| 16.5 | 17,163,010 | 1,093,659 | 0.0637 | 0.9363 | 61.81 |
| 17.5 | 14,959,659 | 166,917 | 0.0112 | 0.9888 | 57.87 |
| 18.5 | 13,363,449 | 201,359 | 0.0151 | 0.9849 | 57.22 |
| 19.5 | 12,632,012 | 555,987 | 0.0440 | 0.9560 | 56.36 |
| 20.5 | 11,445,530 | 617,375 | 0.0539 | 0.9461 | 53.88 |
| 21.5 | 9,299,615 | 517,598 | 0.0557 | 0.9443 | 50.97 |
| 22.5 | 8,673,038 | 277,348 | 0.0320 | 0.9680 | 48.14 |
| 23.5 | 8,367,321 | 313,199 | 0.0374 | 0.9626 | 46.60 |
| 24.5 | 7,670,193 | 100,631 | 0.0131 | 0.9869 | 44.85 |
| 25.5 | 7,097,159 | 286,403 | 0.0404 | 0.9596 | 44.27 |
| 26.5 | 6,746,698 | 95,097 | 0.0141 | 0.9859 | 42.48 |
| 27.5 | 6,567,795 | 436,304 | 0.0664 | 0.9336 | 41.88 |
| 28.5 | 6,089,567 | 63,530 | 0.0104 | 0.9896 | 39.10 |
| 29.5 | 5,871,542 | 9,325 | 0.0016 | 0.9984 | 38.69 |
| 30.5 | 5,862,217 | 133,451 | 0.0228 | 0.9772 | 38.63 |
| 31.5 | 5,391,672 | | 0.0000 | 1.0000 | 37.75 |
| 32.5 | 4,153,672 | 48,702 | 0.0117 | 0.9883 | 37.75 |
| 33.5 | 3,171,517 | 105,997 | 0.0334 | 0.9666 | 37.31 |
| 34.5 | 2,612,444 | 41,778 | 0.0160 | 0.9840 | 36.06 |
| 35.5 | 1,432,816 | | 0.0000 | 1.0000 | 35.48 |
| 36.5 | 1,432,816 | 100,048 | 0.0698 | 0.9302 | 35.48 |
| 37.5 | 1,332,768 | 42,474 | 0.0319 | 0.9681 | 33.01 |
| 38.5 | 1,290,294 | | 0.0000 | 1.0000 | 31.95 |

NEWFOUNDLAND AND LABRADOR HYDRO

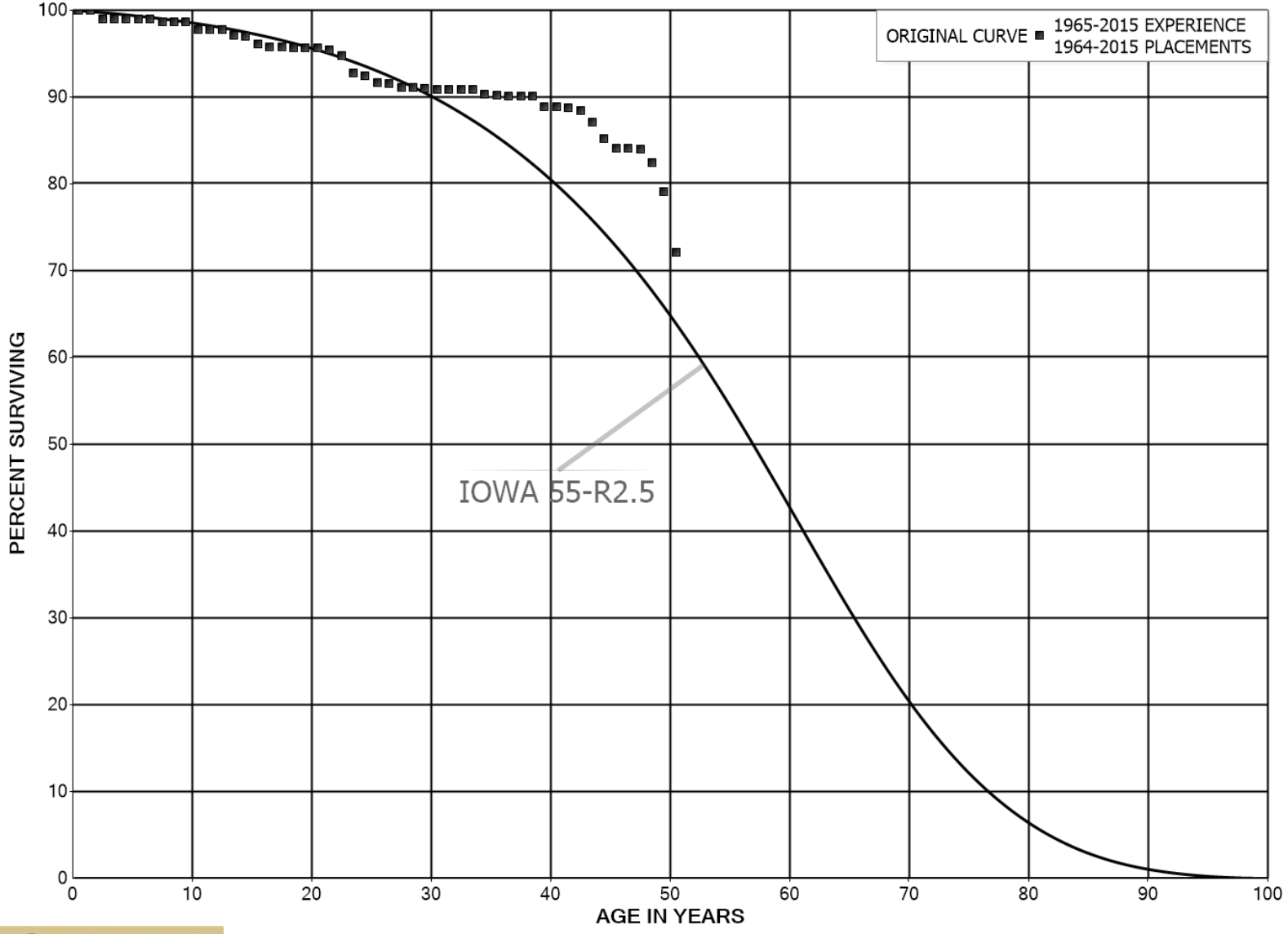
ACCOUNT D02 - DIESEL SYSTEMS AND ENGINES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 1,290,294 | 63,514 | 0.0492 | 0.9508 | 31.95 |
| 40.5 | 1,226,781 | | 0.0000 | 1.0000 | 30.38 |
| 41.5 | 1,226,781 | | 0.0000 | 1.0000 | 30.38 |
| 42.5 | 831,977 | 177,189 | 0.2130 | 0.7870 | 30.38 |
| 43.5 | 654,787 | | 0.0000 | 1.0000 | 23.91 |
| 44.5 | 654,787 | | 0.0000 | 1.0000 | 23.91 |
| 45.5 | 654,787 | | 0.0000 | 1.0000 | 23.91 |
| 46.5 | 654,787 | | 0.0000 | 1.0000 | 23.91 |
| 47.5 | 644,462 | | 0.0000 | 1.0000 | 23.91 |
| 48.5 | 644,462 | | 0.0000 | 1.0000 | 23.91 |
| 49.5 | 644,462 | | 0.0000 | 1.0000 | 23.91 |
| 50.5 | | | | | 23.91 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT D03 - DISCONNECT SWITCHES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT D03 - DISCONNECT SWITCHES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1964-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 22,095,900 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 17,474,940 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 14,553,456 | 152,196 | 0.0105 | 0.9895 | 100.00 |
| 2.5 | 13,319,299 | | 0.0000 | 1.0000 | 98.95 |
| 3.5 | 11,785,456 | | 0.0000 | 1.0000 | 98.95 |
| 4.5 | 10,687,854 | | 0.0000 | 1.0000 | 98.95 |
| 5.5 | 10,630,784 | | 0.0000 | 1.0000 | 98.95 |
| 6.5 | 10,098,449 | 33,780 | 0.0033 | 0.9967 | 98.95 |
| 7.5 | 10,064,669 | 5,835 | 0.0006 | 0.9994 | 98.62 |
| 8.5 | 10,058,833 | | 0.0000 | 1.0000 | 98.57 |
| 9.5 | 10,023,738 | 86,743 | 0.0087 | 0.9913 | 98.57 |
| 10.5 | 9,749,421 | | 0.0000 | 1.0000 | 97.71 |
| 11.5 | 9,591,623 | | 0.0000 | 1.0000 | 97.71 |
| 12.5 | 9,461,971 | 65,466 | 0.0069 | 0.9931 | 97.71 |
| 13.5 | 9,208,933 | 5,635 | 0.0006 | 0.9994 | 97.04 |
| 14.5 | 9,106,778 | 85,267 | 0.0094 | 0.9906 | 96.98 |
| 15.5 | 8,851,445 | 34,139 | 0.0039 | 0.9961 | 96.07 |
| 16.5 | 8,817,307 | 525 | 0.0001 | 0.9999 | 95.70 |
| 17.5 | 8,650,640 | 4,171 | 0.0005 | 0.9995 | 95.69 |
| 18.5 | 8,615,939 | | 0.0000 | 1.0000 | 95.65 |
| 19.5 | 8,314,559 | | 0.0000 | 1.0000 | 95.65 |
| 20.5 | 7,892,188 | 16,500 | 0.0021 | 0.9979 | 95.65 |
| 21.5 | 7,839,960 | 59,725 | 0.0076 | 0.9924 | 95.45 |
| 22.5 | 7,675,252 | 165,724 | 0.0216 | 0.9784 | 94.72 |
| 23.5 | 7,278,498 | 24,416 | 0.0034 | 0.9966 | 92.67 |
| 24.5 | 7,217,752 | 57,499 | 0.0080 | 0.9920 | 92.36 |
| 25.5 | 6,678,456 | 10,004 | 0.0015 | 0.9985 | 91.63 |
| 26.5 | 6,165,686 | 29,781 | 0.0048 | 0.9952 | 91.49 |
| 27.5 | 6,003,213 | | 0.0000 | 1.0000 | 91.05 |
| 28.5 | 5,851,512 | 4,308 | 0.0007 | 0.9993 | 91.05 |
| 29.5 | 5,815,459 | 9,658 | 0.0017 | 0.9983 | 90.98 |
| 30.5 | 5,789,888 | | 0.0000 | 1.0000 | 90.83 |
| 31.5 | 5,745,574 | | 0.0000 | 1.0000 | 90.83 |
| 32.5 | 5,701,491 | 1,339 | 0.0002 | 0.9998 | 90.83 |
| 33.5 | 5,418,574 | 29,924 | 0.0055 | 0.9945 | 90.81 |
| 34.5 | 5,253,728 | 9,267 | 0.0018 | 0.9982 | 90.31 |
| 35.5 | 4,970,406 | 2,913 | 0.0006 | 0.9994 | 90.15 |
| 36.5 | 4,925,181 | 1,802 | 0.0004 | 0.9996 | 90.10 |
| 37.5 | 4,680,873 | 1,368 | 0.0003 | 0.9997 | 90.06 |
| 38.5 | 4,283,650 | 55,197 | 0.0129 | 0.9871 | 90.04 |

NEWFOUNDLAND AND LABRADOR HYDRO

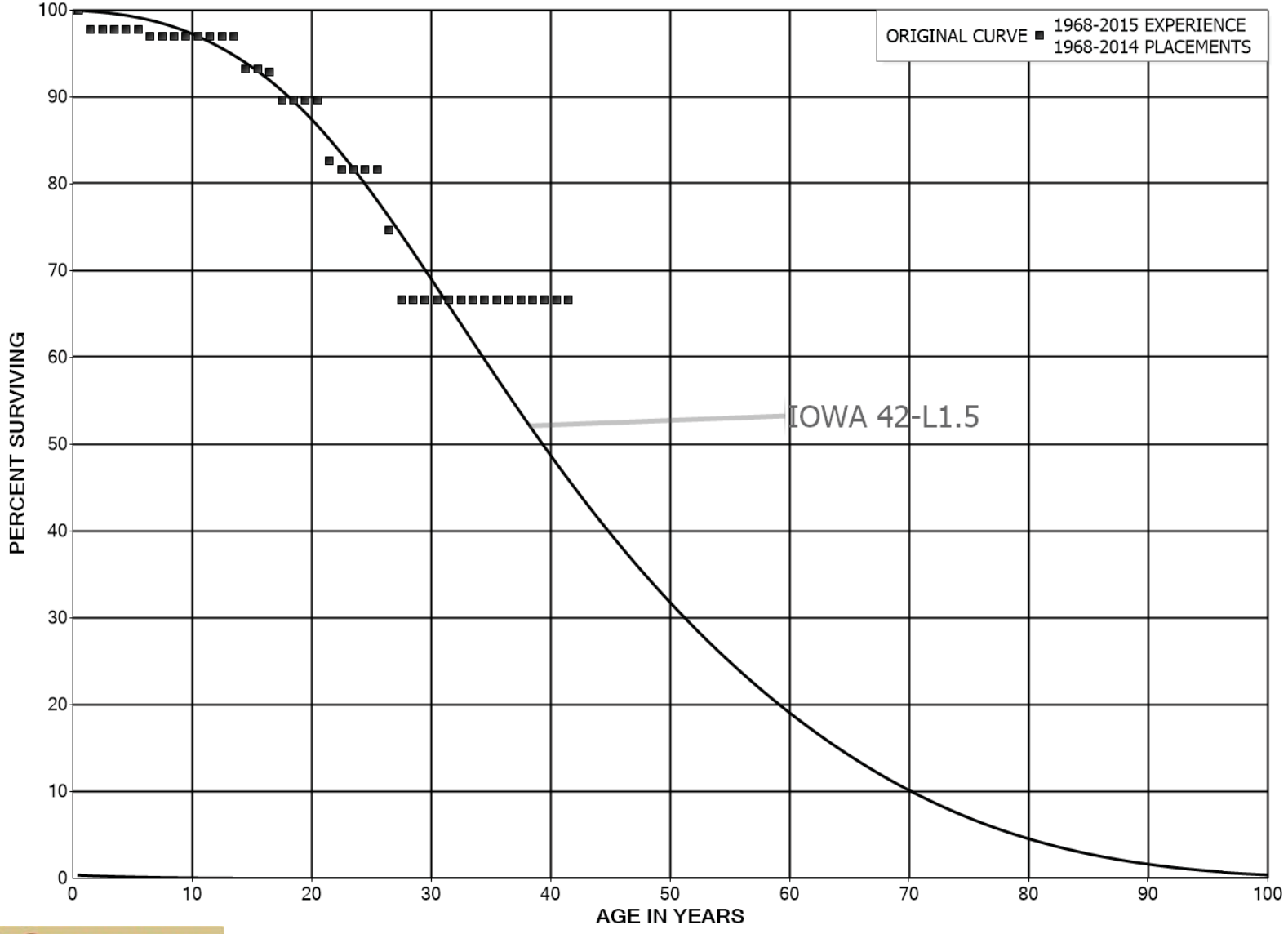
ACCOUNT D03 - DISCONNECT SWITCHES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1964-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 4,206,628 | | 0.0000 | 1.0000 | 88.88 |
| 40.5 | 4,034,274 | 5,338 | 0.0013 | 0.9987 | 88.88 |
| 41.5 | 3,868,789 | 15,233 | 0.0039 | 0.9961 | 88.76 |
| 42.5 | 3,853,556 | 58,335 | 0.0151 | 0.9849 | 88.41 |
| 43.5 | 3,515,199 | 75,906 | 0.0216 | 0.9784 | 87.07 |
| 44.5 | 3,207,262 | 43,610 | 0.0136 | 0.9864 | 85.19 |
| 45.5 | 1,890,413 | | 0.0000 | 1.0000 | 84.03 |
| 46.5 | 1,682,694 | 1,656 | 0.0010 | 0.9990 | 84.03 |
| 47.5 | 1,198,598 | 21,486 | 0.0179 | 0.9821 | 83.95 |
| 48.5 | 462,249 | 18,789 | 0.0406 | 0.9594 | 82.44 |
| 49.5 | 265,793 | 23,522 | 0.0885 | 0.9115 | 79.09 |
| 50.5 | | | | | 72.09 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT D04 - DYKES AND LINERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT D04 - DYKES AND LINERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2014 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 3,257,663 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 3,257,663 | 75,464 | 0.0232 | 0.9768 | 100.00 |
| 1.5 | 3,132,304 | | 0.0000 | 1.0000 | 97.68 |
| 2.5 | 3,132,304 | | 0.0000 | 1.0000 | 97.68 |
| 3.5 | 3,132,304 | | 0.0000 | 1.0000 | 97.68 |
| 4.5 | 2,653,521 | | 0.0000 | 1.0000 | 97.68 |
| 5.5 | 2,653,521 | 19,425 | 0.0073 | 0.9927 | 97.68 |
| 6.5 | 2,634,096 | | 0.0000 | 1.0000 | 96.97 |
| 7.5 | 2,634,096 | | 0.0000 | 1.0000 | 96.97 |
| 8.5 | 2,634,096 | | 0.0000 | 1.0000 | 96.97 |
| 9.5 | 2,634,096 | | 0.0000 | 1.0000 | 96.97 |
| 10.5 | 2,617,582 | | 0.0000 | 1.0000 | 96.97 |
| 11.5 | 2,617,582 | | 0.0000 | 1.0000 | 96.97 |
| 12.5 | 2,617,582 | | 0.0000 | 1.0000 | 96.97 |
| 13.5 | 2,541,694 | 98,455 | 0.0387 | 0.9613 | 96.97 |
| 14.5 | 2,443,238 | | 0.0000 | 1.0000 | 93.21 |
| 15.5 | 2,443,238 | 9,704 | 0.0040 | 0.9960 | 93.21 |
| 16.5 | 2,299,051 | 81,055 | 0.0353 | 0.9647 | 92.84 |
| 17.5 | 2,178,399 | | 0.0000 | 1.0000 | 89.57 |
| 18.5 | 2,178,399 | | 0.0000 | 1.0000 | 89.57 |
| 19.5 | 2,178,399 | | 0.0000 | 1.0000 | 89.57 |
| 20.5 | 2,178,399 | 168,684 | 0.0774 | 0.9226 | 89.57 |
| 21.5 | 2,009,715 | 25,156 | 0.0125 | 0.9875 | 82.63 |
| 22.5 | 1,984,559 | | 0.0000 | 1.0000 | 81.60 |
| 23.5 | 1,767,499 | | 0.0000 | 1.0000 | 81.60 |
| 24.5 | 1,767,499 | | 0.0000 | 1.0000 | 81.60 |
| 25.5 | 1,503,267 | 128,562 | 0.0855 | 0.9145 | 81.60 |
| 26.5 | 1,374,705 | 147,344 | 0.1072 | 0.8928 | 74.62 |
| 27.5 | 1,227,361 | | 0.0000 | 1.0000 | 66.62 |
| 28.5 | 1,045,371 | | 0.0000 | 1.0000 | 66.62 |
| 29.5 | 1,045,371 | | 0.0000 | 1.0000 | 66.62 |
| 30.5 | 833,860 | | 0.0000 | 1.0000 | 66.62 |
| 31.5 | 833,860 | | 0.0000 | 1.0000 | 66.62 |
| 32.5 | 765,383 | | 0.0000 | 1.0000 | 66.62 |
| 33.5 | 675,487 | | 0.0000 | 1.0000 | 66.62 |
| 34.5 | 462,303 | | 0.0000 | 1.0000 | 66.62 |
| 35.5 | 408,403 | | 0.0000 | 1.0000 | 66.62 |
| 36.5 | 408,403 | | 0.0000 | 1.0000 | 66.62 |
| 37.5 | 408,403 | | 0.0000 | 1.0000 | 66.62 |
| 38.5 | 408,403 | | 0.0000 | 1.0000 | 66.62 |

NEWFOUNDLAND AND LABRADOR HYDRO

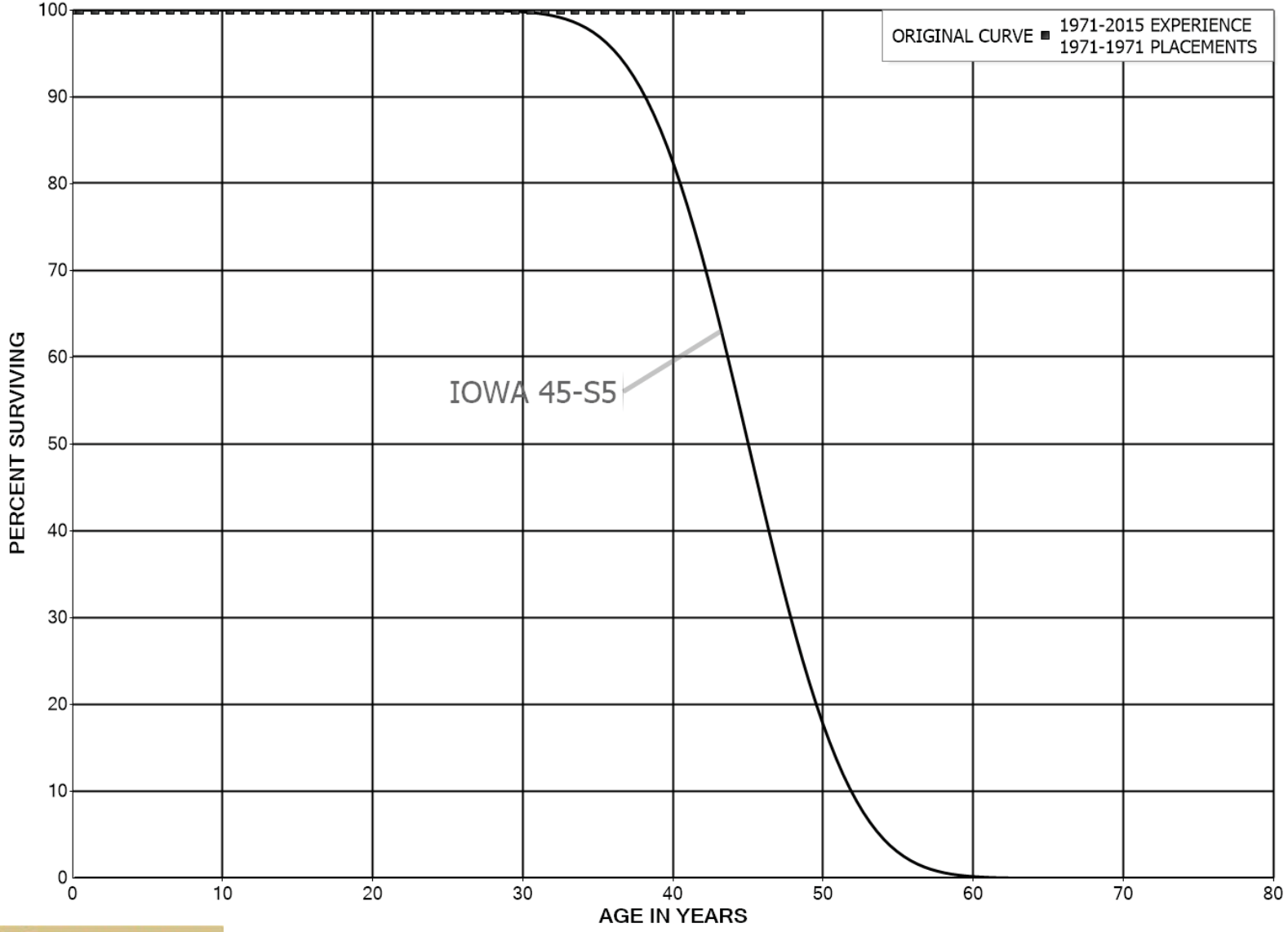
ACCOUNT D04 - DYKES AND LINERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2014 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 408,403 | | 0.0000 | 1.0000 | 66.62 |
| 40.5 | 195,060 | | 0.0000 | 1.0000 | 66.62 |
| 41.5 | 52,960 | | 0.0000 | 1.0000 | 66.62 |
| 42.5 | 52,960 | 26,480 | 0.5000 | 0.5000 | 66.62 |
| 43.5 | 26,480 | | 0.0000 | 1.0000 | 33.31 |
| 44.5 | 26,480 | | 0.0000 | 1.0000 | 33.31 |
| 45.5 | 26,480 | | 0.0000 | 1.0000 | 33.31 |
| 46.5 | 26,480 | | 0.0000 | 1.0000 | 33.31 |
| 47.5 | | | | | 33.31 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT E01 - ELEVATORS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT E01 - ELEVATORS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1971-1971 EXPERIENCE BAND 1971-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

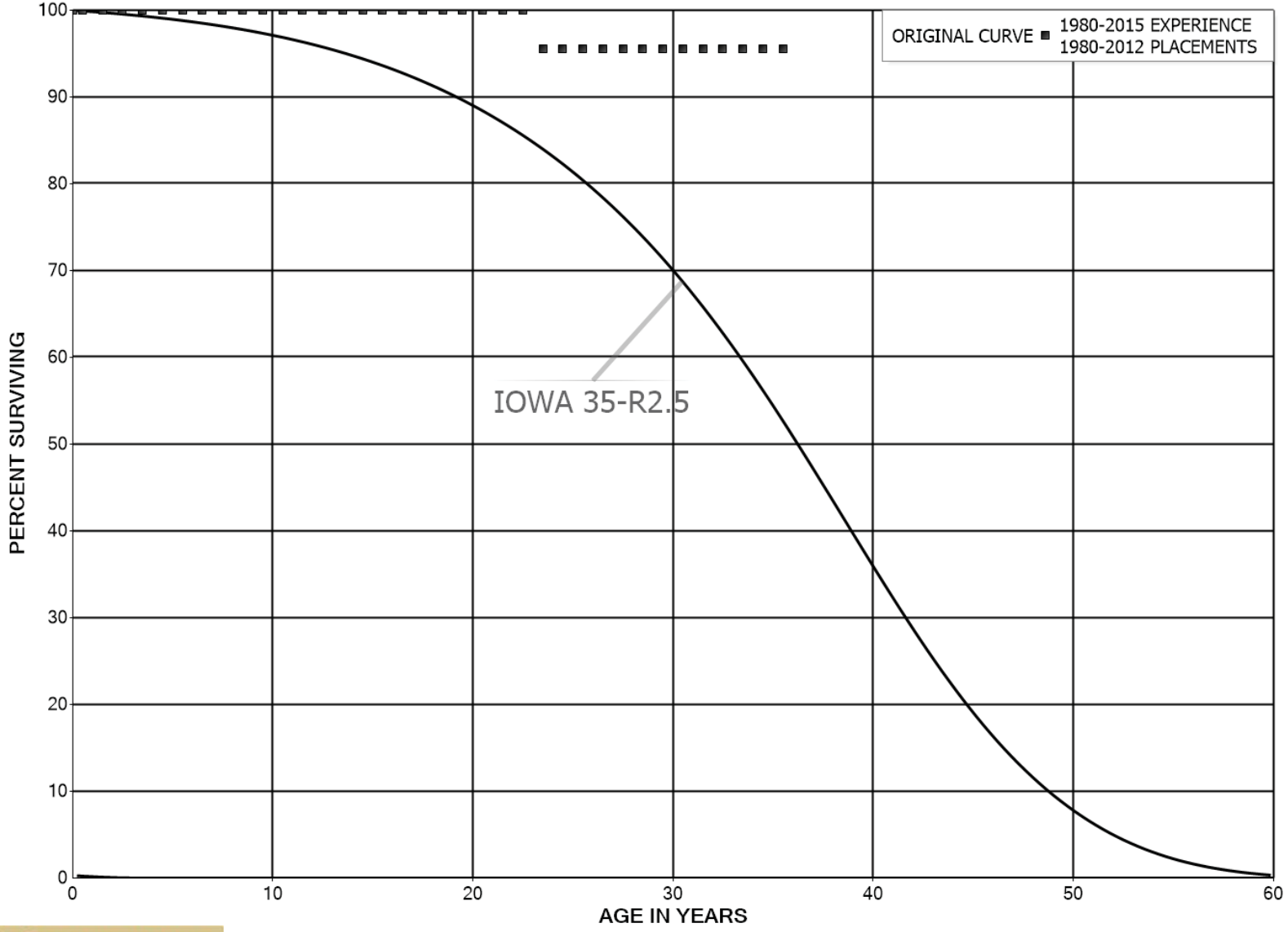
ACCOUNT E01 - ELEVATORS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1971-1971 EXPERIENCE BAND 1971-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 40.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 41.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 42.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 43.5 | 89,800 | | 0.0000 | 1.0000 | 100.00 |
| 44.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT E02 - EMS EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

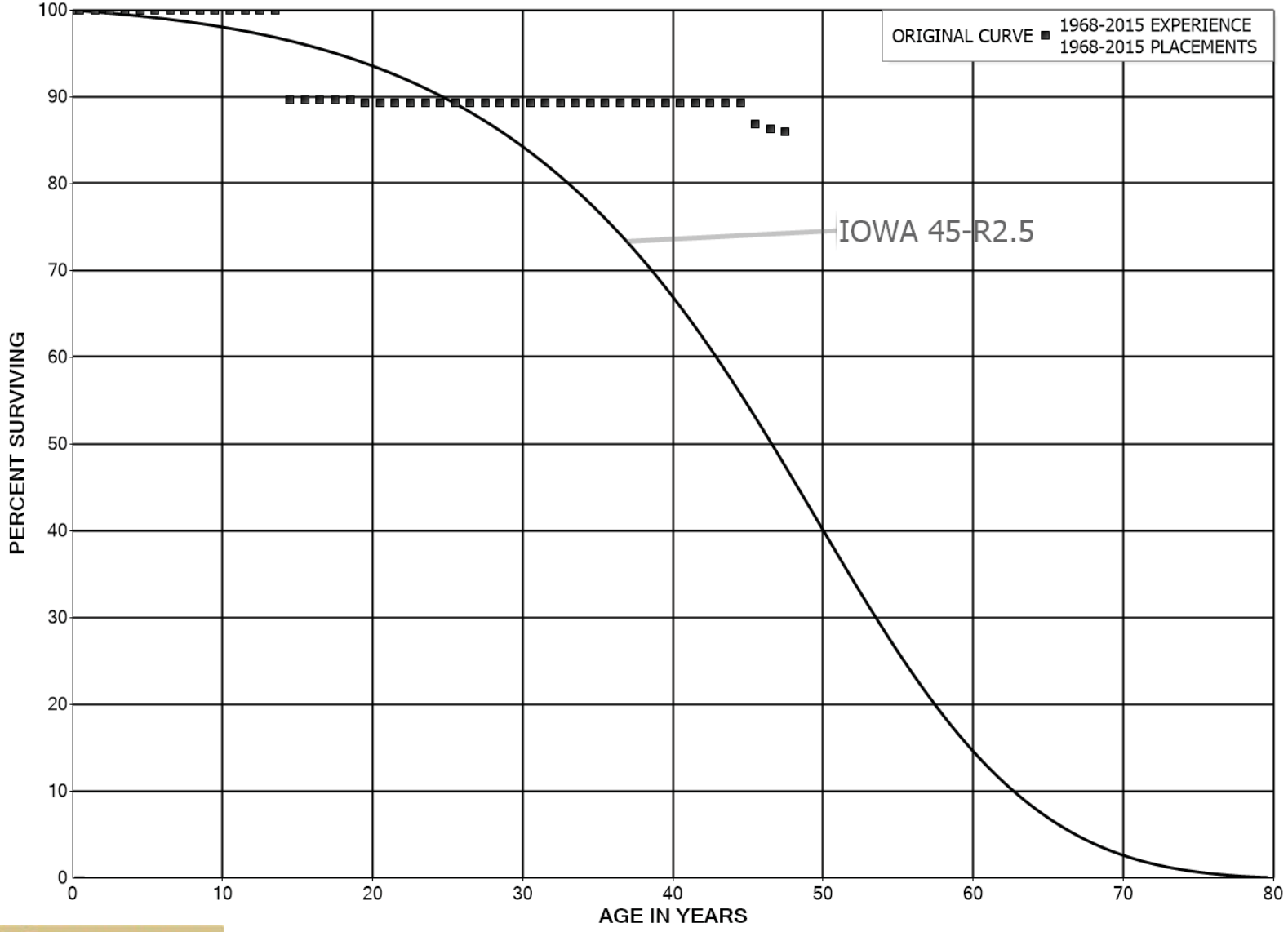
ACCOUNT E02 - EMS EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1980-2012 EXPERIENCE BAND 1980-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 13,468,716 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 13,468,716 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 13,468,716 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 13,468,716 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 13,458,915 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 13,446,886 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 13,446,886 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 13,424,526 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 13,424,526 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 13,424,526 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 13,424,526 | 1,069 | 0.0001 | 0.9999 | 100.00 |
| 10.5 | 13,187,338 | | 0.0000 | 1.0000 | 99.99 |
| 11.5 | 13,179,305 | | 0.0000 | 1.0000 | 99.99 |
| 12.5 | 13,179,305 | | 0.0000 | 1.0000 | 99.99 |
| 13.5 | 13,179,305 | | 0.0000 | 1.0000 | 99.99 |
| 14.5 | 12,879,444 | | 0.0000 | 1.0000 | 99.99 |
| 15.5 | 12,762,329 | | 0.0000 | 1.0000 | 99.99 |
| 16.5 | 12,716,366 | | 0.0000 | 1.0000 | 99.99 |
| 17.5 | 12,617,281 | | 0.0000 | 1.0000 | 99.99 |
| 18.5 | 12,617,281 | | 0.0000 | 1.0000 | 99.99 |
| 19.5 | 12,617,281 | | 0.0000 | 1.0000 | 99.99 |
| 20.5 | 12,617,281 | | 0.0000 | 1.0000 | 99.99 |
| 21.5 | 12,387,941 | | 0.0000 | 1.0000 | 99.99 |
| 22.5 | 12,339,009 | 550,428 | 0.0446 | 0.9554 | 99.99 |
| 23.5 | 11,775,720 | | 0.0000 | 1.0000 | 95.53 |
| 24.5 | 11,775,720 | | 0.0000 | 1.0000 | 95.53 |
| 25.5 | 16,461 | | 0.0000 | 1.0000 | 95.53 |
| 26.5 | 16,461 | | 0.0000 | 1.0000 | 95.53 |
| 27.5 | 16,461 | | 0.0000 | 1.0000 | 95.53 |
| 28.5 | 16,461 | | 0.0000 | 1.0000 | 95.53 |
| 29.5 | 16,461 | | 0.0000 | 1.0000 | 95.53 |
| 30.5 | 16,461 | | 0.0000 | 1.0000 | 95.53 |
| 31.5 | 16,461 | | 0.0000 | 1.0000 | 95.53 |
| 32.5 | 16,461 | | 0.0000 | 1.0000 | 95.53 |
| 33.5 | 16,461 | | 0.0000 | 1.0000 | 95.53 |
| 34.5 | 16,461 | | 0.0000 | 1.0000 | 95.53 |
| 35.5 | | | | | 95.53 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT E03 - ENVIRONMENTAL EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT E03 - ENVIRONMENTAL EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 2,373,439 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 2,353,273 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 2,305,102 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 2,305,102 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 2,305,102 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 2,305,102 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 2,305,102 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 2,305,102 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 2,083,160 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 2,083,160 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 2,083,160 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 2,083,160 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 2,083,160 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 1,267,384 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 1,267,384 | 131,792 | 0.1040 | 0.8960 | 100.00 |
| 14.5 | 1,132,912 | | 0.0000 | 1.0000 | 89.60 |
| 15.5 | 869,328 | | 0.0000 | 1.0000 | 89.60 |
| 16.5 | 869,328 | | 0.0000 | 1.0000 | 89.60 |
| 17.5 | 869,328 | | 0.0000 | 1.0000 | 89.60 |
| 18.5 | 740,085 | 3,002 | 0.0041 | 0.9959 | 89.60 |
| 19.5 | 737,083 | | 0.0000 | 1.0000 | 89.24 |
| 20.5 | 707,136 | | 0.0000 | 1.0000 | 89.24 |
| 21.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 22.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 23.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 24.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 25.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 26.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 27.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 28.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 29.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 30.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 31.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 32.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 33.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 34.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 35.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 36.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 37.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 38.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |

NEWFOUNDLAND AND LABRADOR HYDRO

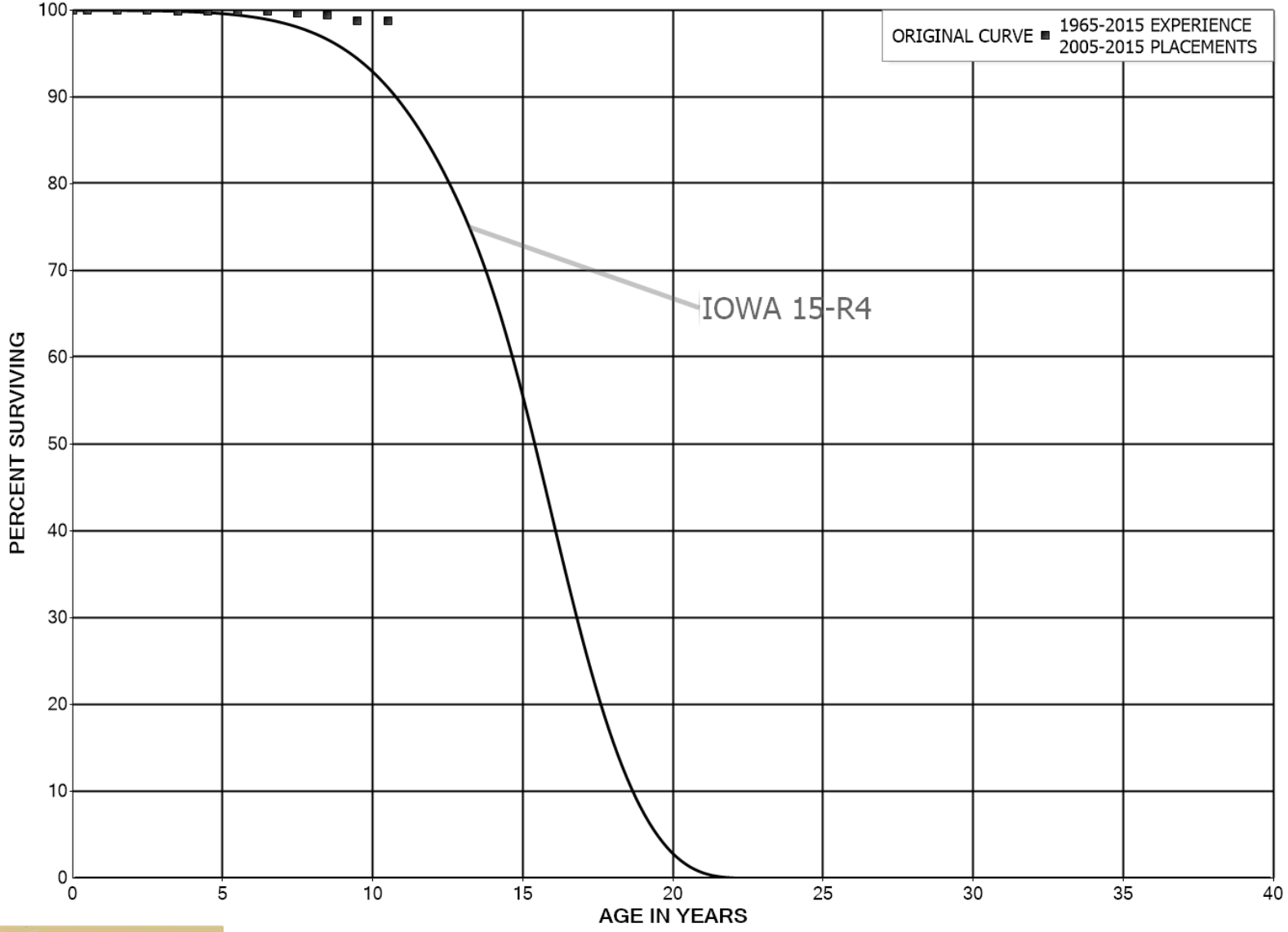
ACCOUNT E03 - ENVIRONMENTAL EQUIPMENT

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 40.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 41.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 42.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 43.5 | 607,037 | | 0.0000 | 1.0000 | 89.24 |
| 44.5 | 607,037 | 16,308 | 0.0269 | 0.9731 | 89.24 |
| 45.5 | 590,730 | 4,000 | 0.0068 | 0.9932 | 86.84 |
| 46.5 | 586,730 | 2,200 | 0.0037 | 0.9963 | 86.25 |
| 47.5 | | | | | 85.93 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT F01 - FALL ARREST EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

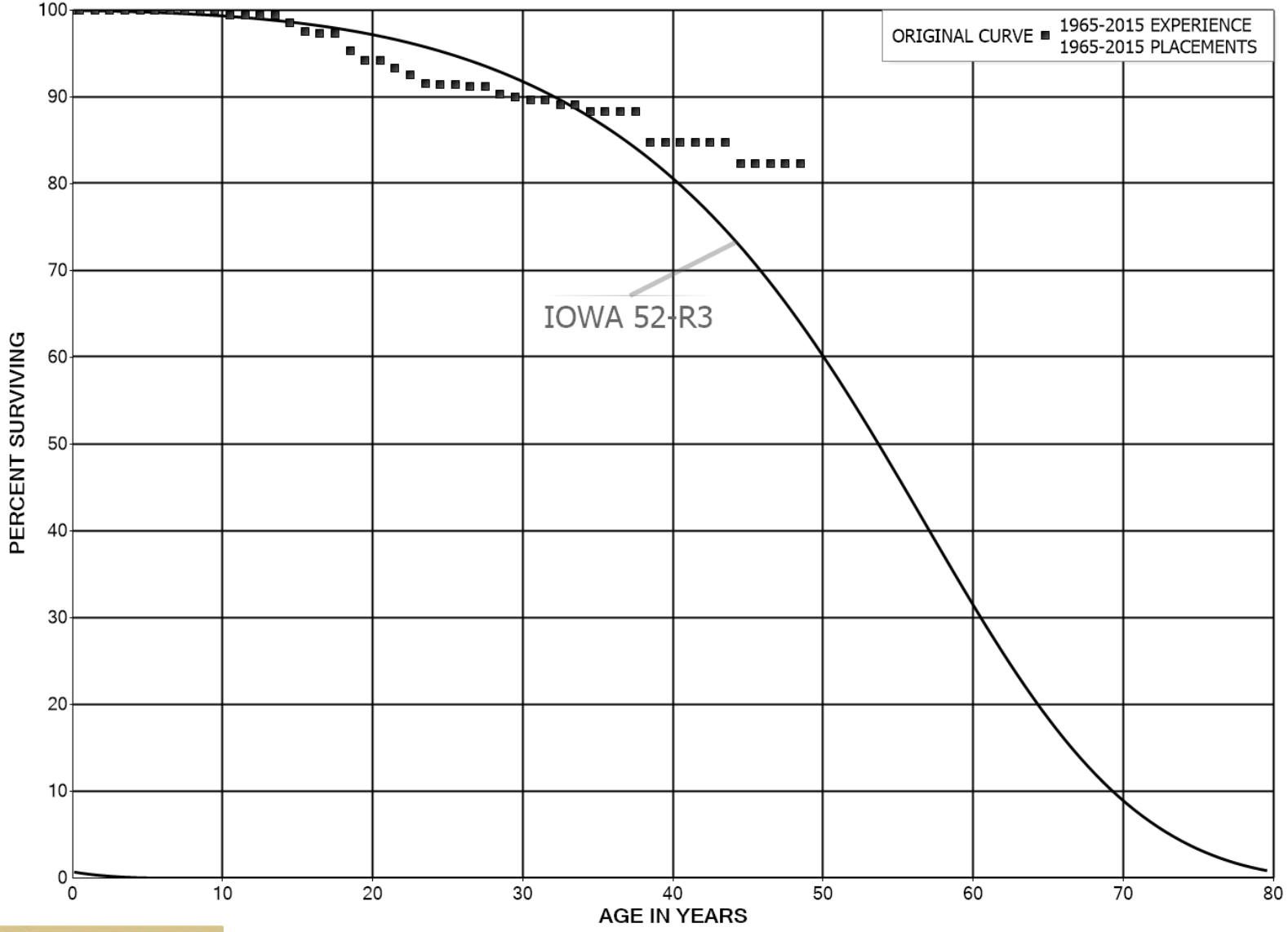
ACCOUNT F01 - FALL ARREST EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 2005-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 2,517,730 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 2,337,058 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 2,000,093 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 1,753,322 | 2,237 | 0.0013 | 0.9987 | 100.00 |
| 3.5 | 1,566,843 | | 0.0000 | 1.0000 | 99.87 |
| 4.5 | 1,361,713 | | 0.0000 | 1.0000 | 99.87 |
| 5.5 | 1,318,612 | | 0.0000 | 1.0000 | 99.87 |
| 6.5 | 817,528 | 1,824 | 0.0022 | 0.9978 | 99.87 |
| 7.5 | 616,425 | 1,824 | 0.0030 | 0.9970 | 99.65 |
| 8.5 | 418,787 | 2,824 | 0.0067 | 0.9933 | 99.35 |
| 9.5 | 198,105 | | 0.0000 | 1.0000 | 98.68 |
| 10.5 | | | | | 98.68 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT F02 - FENCING
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F02 - FENCING

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 7,961,463 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 7,022,742 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 6,652,096 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 6,541,634 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 6,244,965 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 5,431,072 | 1,912 | 0.0004 | 0.9996 | 100.00 |
| 5.5 | 5,429,160 | 2,071 | 0.0004 | 0.9996 | 99.96 |
| 6.5 | 5,171,316 | | 0.0000 | 1.0000 | 99.93 |
| 7.5 | 5,112,854 | | 0.0000 | 1.0000 | 99.93 |
| 8.5 | 5,112,854 | | 0.0000 | 1.0000 | 99.93 |
| 9.5 | 5,107,400 | 26,114 | 0.0051 | 0.9949 | 99.93 |
| 10.5 | 4,965,283 | | 0.0000 | 1.0000 | 99.42 |
| 11.5 | 4,932,835 | | 0.0000 | 1.0000 | 99.42 |
| 12.5 | 3,916,965 | | 0.0000 | 1.0000 | 99.42 |
| 13.5 | 3,866,679 | 36,546 | 0.0095 | 0.9905 | 99.42 |
| 14.5 | 3,666,545 | 37,467 | 0.0102 | 0.9898 | 98.48 |
| 15.5 | 3,576,253 | 8,160 | 0.0023 | 0.9977 | 97.47 |
| 16.5 | 3,524,231 | | 0.0000 | 1.0000 | 97.25 |
| 17.5 | 3,391,217 | 70,232 | 0.0207 | 0.9793 | 97.25 |
| 18.5 | 3,263,809 | 37,468 | 0.0115 | 0.9885 | 95.23 |
| 19.5 | 3,181,332 | | 0.0000 | 1.0000 | 94.14 |
| 20.5 | 3,098,467 | 29,848 | 0.0096 | 0.9904 | 94.14 |
| 21.5 | 2,984,763 | 23,138 | 0.0078 | 0.9922 | 93.23 |
| 22.5 | 2,917,682 | 31,996 | 0.0110 | 0.9890 | 92.51 |
| 23.5 | 2,762,852 | 1,507 | 0.0005 | 0.9995 | 91.50 |
| 24.5 | 2,623,746 | 995 | 0.0004 | 0.9996 | 91.45 |
| 25.5 | 2,510,515 | 7,120 | 0.0028 | 0.9972 | 91.41 |
| 26.5 | 2,320,720 | 311 | 0.0001 | 0.9999 | 91.15 |
| 27.5 | 2,244,565 | 21,240 | 0.0095 | 0.9905 | 91.14 |
| 28.5 | 2,009,953 | 7,243 | 0.0036 | 0.9964 | 90.28 |
| 29.5 | 1,976,843 | 6,454 | 0.0033 | 0.9967 | 89.95 |
| 30.5 | 1,725,332 | | 0.0000 | 1.0000 | 89.66 |
| 31.5 | 1,640,234 | 10,169 | 0.0062 | 0.9938 | 89.66 |
| 32.5 | 1,347,668 | | 0.0000 | 1.0000 | 89.10 |
| 33.5 | 1,158,044 | 10,359 | 0.0089 | 0.9911 | 89.10 |
| 34.5 | 1,062,416 | | 0.0000 | 1.0000 | 88.31 |
| 35.5 | 782,663 | | 0.0000 | 1.0000 | 88.31 |
| 36.5 | 764,382 | | 0.0000 | 1.0000 | 88.31 |
| 37.5 | 618,632 | 25,113 | 0.0406 | 0.9594 | 88.31 |
| 38.5 | 574,277 | | 0.0000 | 1.0000 | 84.72 |

NEWFOUNDLAND AND LABRADOR HYDRO

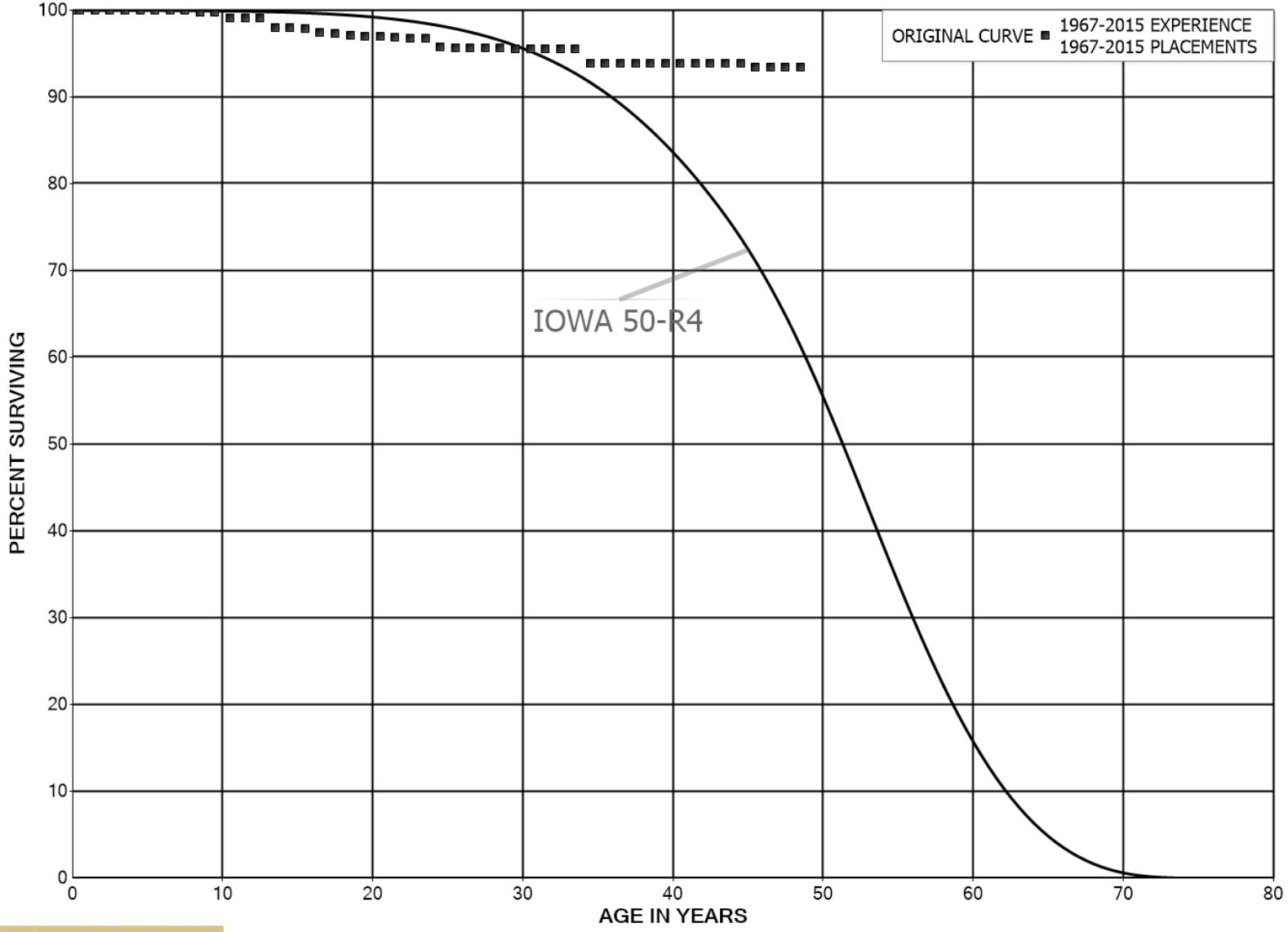
ACCOUNT F02 - FENCING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 514,981 | | 0.0000 | 1.0000 | 84.72 |
| 40.5 | 503,692 | | 0.0000 | 1.0000 | 84.72 |
| 41.5 | 451,743 | | 0.0000 | 1.0000 | 84.72 |
| 42.5 | 427,075 | | 0.0000 | 1.0000 | 84.72 |
| 43.5 | 361,336 | 10,413 | 0.0288 | 0.9712 | 84.72 |
| 44.5 | 337,611 | | 0.0000 | 1.0000 | 82.28 |
| 45.5 | 220,329 | | 0.0000 | 1.0000 | 82.28 |
| 46.5 | 154,156 | | 0.0000 | 1.0000 | 82.28 |
| 47.5 | 95,308 | | 0.0000 | 1.0000 | 82.28 |
| 48.5 | | | | | 82.28 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT F03 - FIRE FIGHTING EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F03 - FIRE FIGHTING EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 15,017,245 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 11,895,429 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 10,944,270 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 10,386,193 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 9,799,981 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 9,589,416 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 9,585,000 | 7,480 | 0.0008 | 0.9992 | 100.00 |
| 6.5 | 7,447,725 | | 0.0000 | 1.0000 | 99.92 |
| 7.5 | 7,209,032 | 12,437 | 0.0017 | 0.9983 | 99.92 |
| 8.5 | 7,196,595 | | 0.0000 | 1.0000 | 99.75 |
| 9.5 | 7,196,595 | 45,673 | 0.0063 | 0.9937 | 99.75 |
| 10.5 | 7,095,680 | | 0.0000 | 1.0000 | 99.12 |
| 11.5 | 7,095,680 | | 0.0000 | 1.0000 | 99.12 |
| 12.5 | 6,437,931 | 72,271 | 0.0112 | 0.9888 | 99.12 |
| 13.5 | 5,736,420 | 2,972 | 0.0005 | 0.9995 | 98.00 |
| 14.5 | 5,517,383 | 8,917 | 0.0016 | 0.9984 | 97.95 |
| 15.5 | 5,508,466 | 23,592 | 0.0043 | 0.9957 | 97.79 |
| 16.5 | 5,390,836 | 2,414 | 0.0004 | 0.9996 | 97.38 |
| 17.5 | 5,319,903 | 16,189 | 0.0030 | 0.9970 | 97.33 |
| 18.5 | 5,123,461 | 6,509 | 0.0013 | 0.9987 | 97.04 |
| 19.5 | 5,116,952 | 203 | 0.0000 | 1.0000 | 96.91 |
| 20.5 | 5,092,231 | 4,691 | 0.0009 | 0.9991 | 96.91 |
| 21.5 | 5,087,540 | 3,269 | 0.0006 | 0.9994 | 96.82 |
| 22.5 | 5,084,271 | 92 | 0.0000 | 1.0000 | 96.76 |
| 23.5 | 4,935,098 | 54,919 | 0.0111 | 0.9889 | 96.76 |
| 24.5 | 4,880,179 | 2,170 | 0.0004 | 0.9996 | 95.68 |
| 25.5 | 4,813,682 | 406 | 0.0001 | 0.9999 | 95.64 |
| 26.5 | 4,050,609 | | 0.0000 | 1.0000 | 95.63 |
| 27.5 | 3,833,130 | | 0.0000 | 1.0000 | 95.63 |
| 28.5 | 3,736,336 | 4,710 | 0.0013 | 0.9987 | 95.63 |
| 29.5 | 3,578,679 | | 0.0000 | 1.0000 | 95.51 |
| 30.5 | 3,392,687 | | 0.0000 | 1.0000 | 95.51 |
| 31.5 | 2,808,935 | | 0.0000 | 1.0000 | 95.51 |
| 32.5 | 2,714,260 | | 0.0000 | 1.0000 | 95.51 |
| 33.5 | 2,307,362 | 40,186 | 0.0174 | 0.9826 | 95.51 |
| 34.5 | 2,257,774 | | 0.0000 | 1.0000 | 93.84 |
| 35.5 | 1,536,580 | | 0.0000 | 1.0000 | 93.84 |
| 36.5 | 1,421,399 | | 0.0000 | 1.0000 | 93.84 |
| 37.5 | 1,229,262 | | 0.0000 | 1.0000 | 93.84 |
| 38.5 | 1,200,404 | | 0.0000 | 1.0000 | 93.84 |

NEWFOUNDLAND AND LABRADOR HYDRO

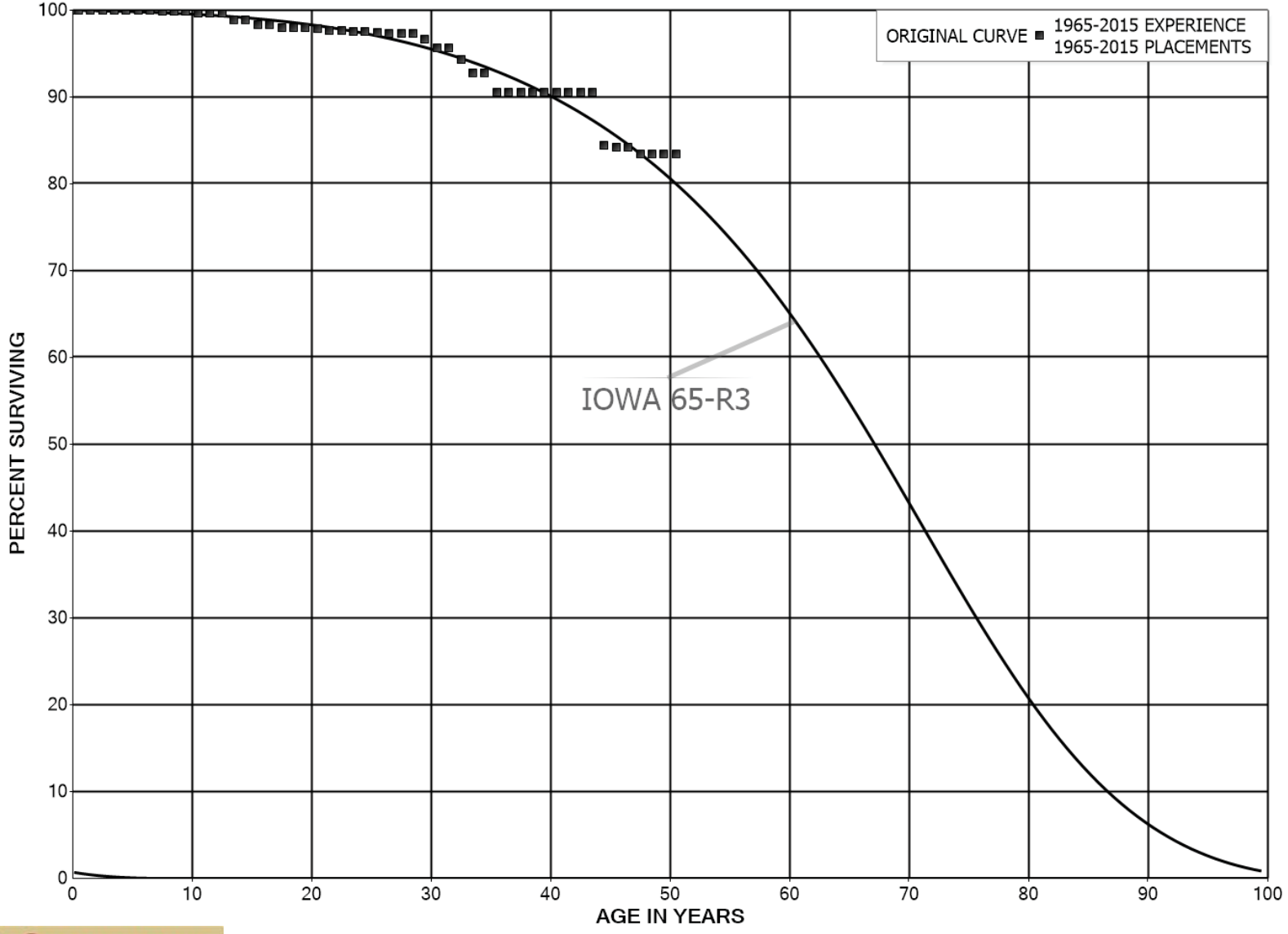
ACCOUNT F03 - FIRE FIGHTING EQUIPMENT

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 1,142,056 | | 0.0000 | 1.0000 | 93.84 |
| 40.5 | 1,132,055 | | 0.0000 | 1.0000 | 93.84 |
| 41.5 | 1,132,055 | | 0.0000 | 1.0000 | 93.84 |
| 42.5 | 1,110,366 | | 0.0000 | 1.0000 | 93.84 |
| 43.5 | 1,110,366 | | 0.0000 | 1.0000 | 93.84 |
| 44.5 | 828,411 | 4,076 | 0.0049 | 0.9951 | 93.84 |
| 45.5 | 815,131 | | 0.0000 | 1.0000 | 93.38 |
| 46.5 | 713,899 | | 0.0000 | 1.0000 | 93.38 |
| 47.5 | 597,273 | | 0.0000 | 1.0000 | 93.38 |
| 48.5 | | | | | 93.38 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT F04 - FOOTINGS AND FOUNDATIONS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F04 - FOOTINGS AND FOUNDATIONS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 21,754,410 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 18,902,176 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 18,221,916 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 18,221,916 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 18,199,235 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 18,158,647 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 18,158,647 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 18,158,647 | 26,848 | 0.0015 | 0.9985 | 100.00 |
| 7.5 | 18,102,476 | | 0.0000 | 1.0000 | 99.85 |
| 8.5 | 18,102,476 | 291 | 0.0000 | 1.0000 | 99.85 |
| 9.5 | 18,102,185 | 36,626 | 0.0020 | 0.9980 | 99.85 |
| 10.5 | 18,065,559 | | 0.0000 | 1.0000 | 99.65 |
| 11.5 | 18,055,845 | 100 | 0.0000 | 1.0000 | 99.65 |
| 12.5 | 17,010,811 | 140,699 | 0.0083 | 0.9917 | 99.65 |
| 13.5 | 14,244,637 | | 0.0000 | 1.0000 | 98.82 |
| 14.5 | 14,210,780 | 81,410 | 0.0057 | 0.9943 | 98.82 |
| 15.5 | 14,098,878 | | 0.0000 | 1.0000 | 98.26 |
| 16.5 | 14,033,306 | 47,046 | 0.0034 | 0.9966 | 98.26 |
| 17.5 | 13,872,129 | | 0.0000 | 1.0000 | 97.93 |
| 18.5 | 13,872,129 | 1,380 | 0.0001 | 0.9999 | 97.93 |
| 19.5 | 13,721,794 | 11,757 | 0.0009 | 0.9991 | 97.92 |
| 20.5 | 13,242,979 | 24,525 | 0.0019 | 0.9981 | 97.83 |
| 21.5 | 13,213,028 | 10,261 | 0.0008 | 0.9992 | 97.65 |
| 22.5 | 13,118,028 | 4,866 | 0.0004 | 0.9996 | 97.58 |
| 23.5 | 12,486,548 | 11,384 | 0.0009 | 0.9991 | 97.54 |
| 24.5 | 11,462,453 | 12,531 | 0.0011 | 0.9989 | 97.45 |
| 25.5 | 10,137,769 | 4,864 | 0.0005 | 0.9995 | 97.35 |
| 26.5 | 9,792,032 | 6,265 | 0.0006 | 0.9994 | 97.30 |
| 27.5 | 9,669,954 | | 0.0000 | 1.0000 | 97.24 |
| 28.5 | 9,306,278 | 62,933 | 0.0068 | 0.9932 | 97.24 |
| 29.5 | 9,195,697 | 87,255 | 0.0095 | 0.9905 | 96.58 |
| 30.5 | 9,082,596 | 9,145 | 0.0010 | 0.9990 | 95.66 |
| 31.5 | 9,065,633 | 117,521 | 0.0130 | 0.9870 | 95.57 |
| 32.5 | 8,181,919 | 137,940 | 0.0169 | 0.9831 | 94.33 |
| 33.5 | 7,572,102 | | 0.0000 | 1.0000 | 92.74 |
| 34.5 | 7,272,645 | 172,290 | 0.0237 | 0.9763 | 92.74 |
| 35.5 | 6,560,246 | 331 | 0.0001 | 0.9999 | 90.54 |
| 36.5 | 6,225,772 | 241 | 0.0000 | 1.0000 | 90.54 |
| 37.5 | 5,118,947 | | 0.0000 | 1.0000 | 90.53 |
| 38.5 | 3,852,682 | | 0.0000 | 1.0000 | 90.53 |

NEWFOUNDLAND AND LABRADOR HYDRO

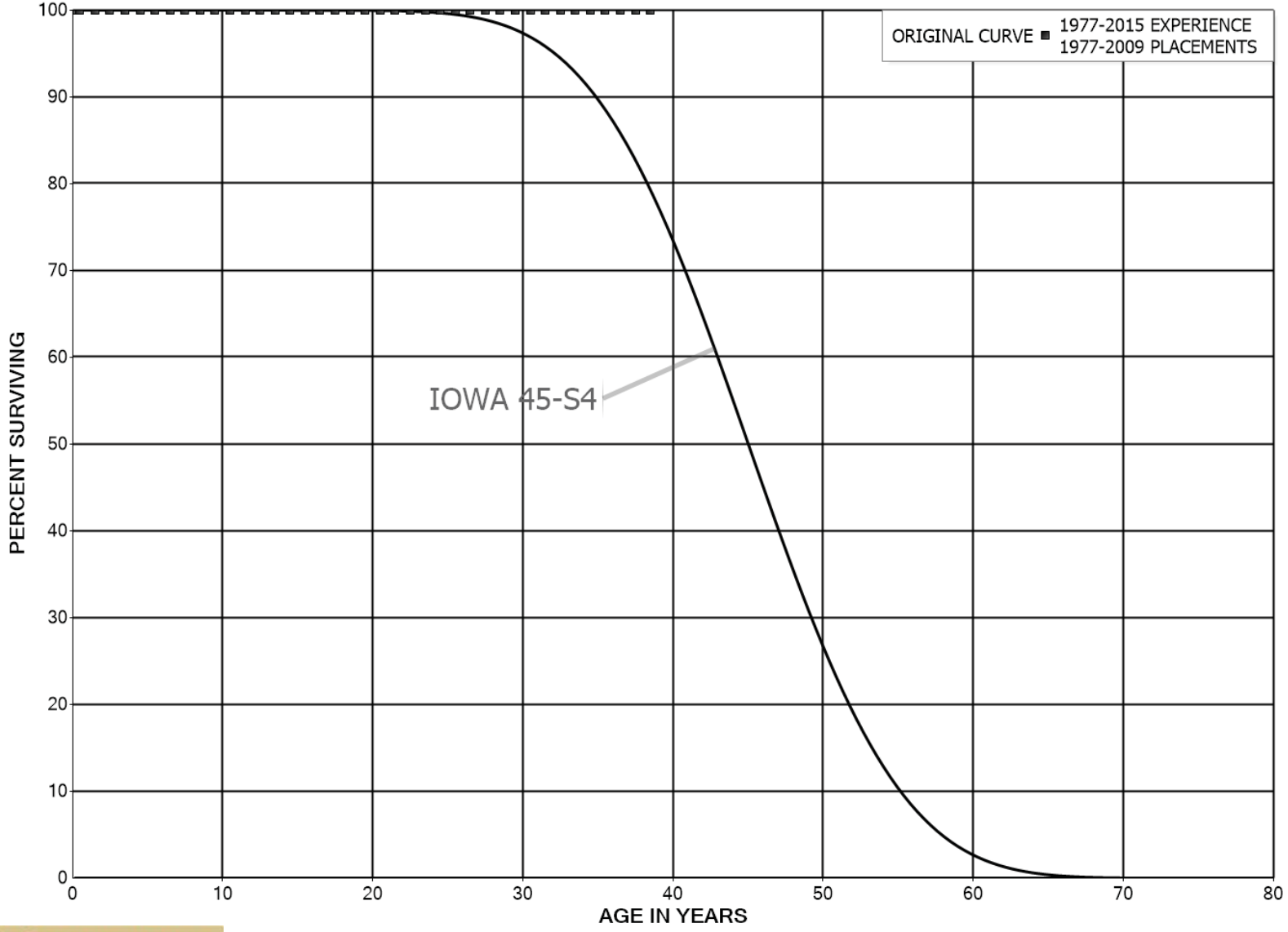
ACCOUNT F04 - FOOTINGS AND FOUNDATIONS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 3,739,616 | | 0.0000 | 1.0000 | 90.53 |
| 40.5 | 3,631,175 | | 0.0000 | 1.0000 | 90.53 |
| 41.5 | 3,562,891 | | 0.0000 | 1.0000 | 90.53 |
| 42.5 | 3,548,308 | | 0.0000 | 1.0000 | 90.53 |
| 43.5 | 3,548,308 | 240,679 | 0.0678 | 0.9322 | 90.53 |
| 44.5 | 3,307,629 | 9,345 | 0.0028 | 0.9972 | 84.39 |
| 45.5 | 2,808,082 | | 0.0000 | 1.0000 | 84.15 |
| 46.5 | 2,808,082 | 26,026 | 0.0093 | 0.9907 | 84.15 |
| 47.5 | 1,890,964 | | 0.0000 | 1.0000 | 83.37 |
| 48.5 | 167,301 | | 0.0000 | 1.0000 | 83.37 |
| 49.5 | 167,301 | | 0.0000 | 1.0000 | 83.37 |
| 50.5 | | | | | 83.37 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT F05 - FREQUENCY CONVERSION
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

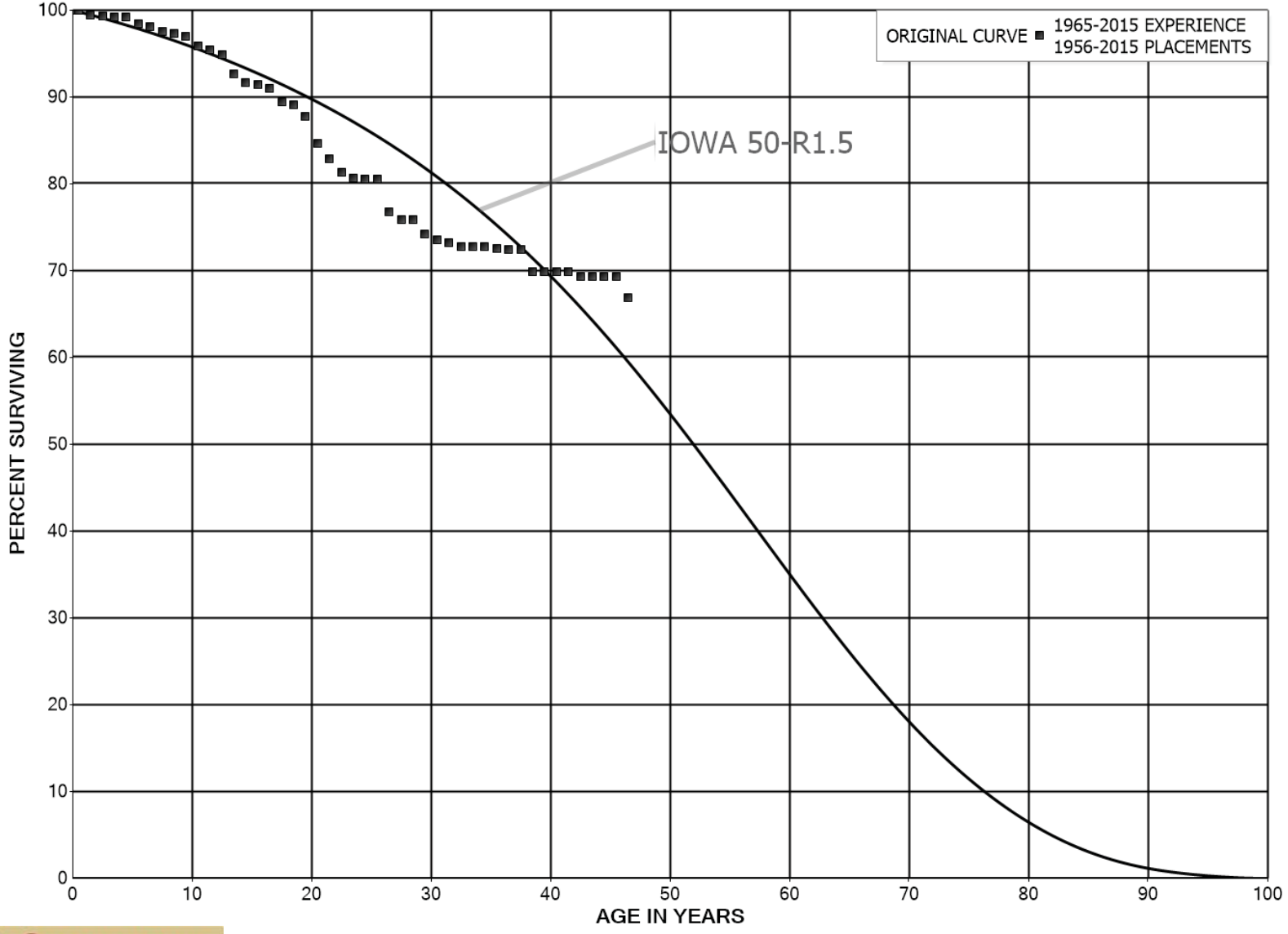
ACCOUNT F05 - FREQUENCY CONVERSION

ORIGINAL LIFE TABLE

PLACEMENT BAND 1977-2009 EXPERIENCE BAND 1977-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 2,453,577 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 2,453,577 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 2,453,577 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 2,453,577 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 2,453,577 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 2,453,577 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 2,453,577 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 1,694,970 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 1,694,970 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 1,666,961 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 1,666,961 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 1,619,259 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 1,607,215 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 1,607,215 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 1,607,215 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 1,607,215 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 1,607,215 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT F06 - FUEL SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F06 - FUEL SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1956-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 46,436,130 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 37,579,279 | 244,046 | 0.0065 | 0.9935 | 100.00 |
| 1.5 | 35,743,238 | 25,840 | 0.0007 | 0.9993 | 99.35 |
| 2.5 | 33,302,159 | 30,932 | 0.0009 | 0.9991 | 99.28 |
| 3.5 | 29,303,216 | 16,568 | 0.0006 | 0.9994 | 99.19 |
| 4.5 | 27,562,051 | 197,053 | 0.0071 | 0.9929 | 99.13 |
| 5.5 | 24,463,713 | 82,926 | 0.0034 | 0.9966 | 98.42 |
| 6.5 | 22,071,903 | 119,683 | 0.0054 | 0.9946 | 98.09 |
| 7.5 | 20,827,974 | 50,544 | 0.0024 | 0.9976 | 97.56 |
| 8.5 | 20,030,715 | 86,687 | 0.0043 | 0.9957 | 97.32 |
| 9.5 | 19,398,058 | 208,578 | 0.0108 | 0.9892 | 96.90 |
| 10.5 | 18,409,008 | 83,498 | 0.0045 | 0.9955 | 95.86 |
| 11.5 | 18,325,510 | 113,661 | 0.0062 | 0.9938 | 95.42 |
| 12.5 | 17,941,686 | 424,782 | 0.0237 | 0.9763 | 94.83 |
| 13.5 | 17,080,407 | 187,859 | 0.0110 | 0.9890 | 92.58 |
| 14.5 | 15,448,635 | 22,641 | 0.0015 | 0.9985 | 91.57 |
| 15.5 | 15,181,320 | 78,987 | 0.0052 | 0.9948 | 91.43 |
| 16.5 | 14,692,087 | 251,530 | 0.0171 | 0.9829 | 90.96 |
| 17.5 | 14,356,823 | 47,942 | 0.0033 | 0.9967 | 89.40 |
| 18.5 | 14,219,187 | 217,848 | 0.0153 | 0.9847 | 89.10 |
| 19.5 | 13,597,437 | 484,629 | 0.0356 | 0.9644 | 87.74 |
| 20.5 | 12,851,694 | 267,371 | 0.0208 | 0.9792 | 84.61 |
| 21.5 | 12,213,145 | 223,790 | 0.0183 | 0.9817 | 82.85 |
| 22.5 | 11,650,530 | 109,204 | 0.0094 | 0.9906 | 81.33 |
| 23.5 | 10,843,133 | 4,557 | 0.0004 | 0.9996 | 80.57 |
| 24.5 | 10,391,654 | | 0.0000 | 1.0000 | 80.53 |
| 25.5 | 9,618,285 | 456,005 | 0.0474 | 0.9526 | 80.53 |
| 26.5 | 8,879,299 | 96,528 | 0.0109 | 0.9891 | 76.72 |
| 27.5 | 8,768,843 | 2,100 | 0.0002 | 0.9998 | 75.88 |
| 28.5 | 8,306,579 | 180,152 | 0.0217 | 0.9783 | 75.86 |
| 29.5 | 8,101,753 | 83,242 | 0.0103 | 0.9897 | 74.22 |
| 30.5 | 7,813,484 | 27,816 | 0.0036 | 0.9964 | 73.46 |
| 31.5 | 7,785,668 | 48,759 | 0.0063 | 0.9937 | 73.19 |
| 32.5 | 7,719,714 | 1,500 | 0.0002 | 0.9998 | 72.74 |
| 33.5 | 7,613,667 | 3,600 | 0.0005 | 0.9995 | 72.72 |
| 34.5 | 7,114,455 | 15,000 | 0.0021 | 0.9979 | 72.69 |
| 35.5 | 2,624,538 | 3,113 | 0.0012 | 0.9988 | 72.53 |
| 36.5 | 2,621,425 | | 0.0000 | 1.0000 | 72.45 |
| 37.5 | 2,493,155 | 89,532 | 0.0359 | 0.9641 | 72.45 |
| 38.5 | 2,387,033 | 100 | 0.0000 | 1.0000 | 69.85 |

NEWFOUNDLAND AND LABRADOR HYDRO

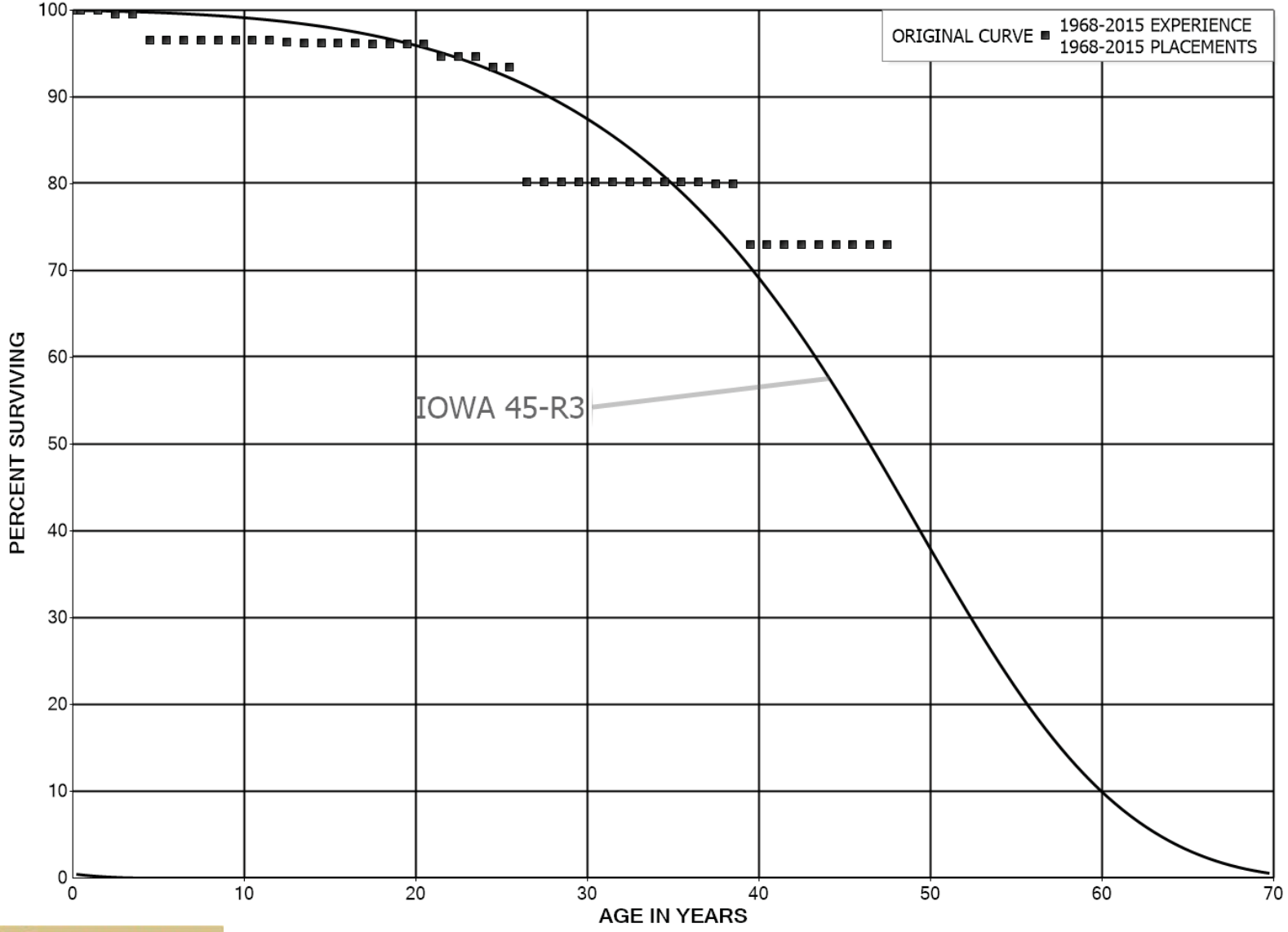
ACCOUNT F06 - FUEL SYSTEMS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1956-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 2,174,446 | | 0.0000 | 1.0000 | 69.84 |
| 40.5 | 2,130,030 | | 0.0000 | 1.0000 | 69.84 |
| 41.5 | 1,839,417 | 13,277 | 0.0072 | 0.9928 | 69.84 |
| 42.5 | 1,822,895 | | 0.0000 | 1.0000 | 69.34 |
| 43.5 | 1,822,895 | | 0.0000 | 1.0000 | 69.34 |
| 44.5 | 1,735,607 | | 0.0000 | 1.0000 | 69.34 |
| 45.5 | 1,734,807 | 63,382 | 0.0365 | 0.9635 | 69.34 |
| 46.5 | 913,885 | | 0.0000 | 1.0000 | 66.81 |
| 47.5 | 85,268 | | 0.0000 | 1.0000 | 66.81 |
| 48.5 | 85,268 | | 0.0000 | 1.0000 | 66.81 |
| 49.5 | 11,786 | | 0.0000 | 1.0000 | 66.81 |
| 50.5 | 11,786 | | 0.0000 | 1.0000 | 66.81 |
| 51.5 | 11,786 | | 0.0000 | 1.0000 | 66.81 |
| 52.5 | 11,786 | | 0.0000 | 1.0000 | 66.81 |
| 53.5 | 11,786 | | 0.0000 | 1.0000 | 66.81 |
| 54.5 | 11,786 | | 0.0000 | 1.0000 | 66.81 |
| 55.5 | 11,786 | | 0.0000 | 1.0000 | 66.81 |
| 56.5 | 11,786 | | 0.0000 | 1.0000 | 66.81 |
| 57.5 | 11,786 | | 0.0000 | 1.0000 | 66.81 |
| 58.5 | 11,786 | | 0.0000 | 1.0000 | 66.81 |
| 59.5 | | | | | 66.81 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT G01 - GAS TURBINE SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G01 - GAS TURBINE SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 74,754,391 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 43,459,283 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 41,367,811 | 185,109 | 0.0045 | 0.9955 | 100.00 |
| 2.5 | 33,371,915 | | 0.0000 | 1.0000 | 99.55 |
| 3.5 | 32,995,571 | 1,011,679 | 0.0307 | 0.9693 | 99.55 |
| 4.5 | 31,761,027 | | 0.0000 | 1.0000 | 96.50 |
| 5.5 | 30,492,331 | | 0.0000 | 1.0000 | 96.50 |
| 6.5 | 30,362,697 | | 0.0000 | 1.0000 | 96.50 |
| 7.5 | 30,362,697 | | 0.0000 | 1.0000 | 96.50 |
| 8.5 | 30,331,597 | | 0.0000 | 1.0000 | 96.50 |
| 9.5 | 30,331,597 | | 0.0000 | 1.0000 | 96.50 |
| 10.5 | 30,331,597 | | 0.0000 | 1.0000 | 96.50 |
| 11.5 | 30,331,597 | 57,145 | 0.0019 | 0.9981 | 96.50 |
| 12.5 | 30,274,452 | 48,384 | 0.0016 | 0.9984 | 96.32 |
| 13.5 | 30,226,068 | | 0.0000 | 1.0000 | 96.16 |
| 14.5 | 30,164,230 | | 0.0000 | 1.0000 | 96.16 |
| 15.5 | 30,164,230 | 2,141 | 0.0001 | 0.9999 | 96.16 |
| 16.5 | 30,153,001 | 18,390 | 0.0006 | 0.9994 | 96.16 |
| 17.5 | 30,134,611 | | 0.0000 | 1.0000 | 96.10 |
| 18.5 | 29,586,371 | | 0.0000 | 1.0000 | 96.10 |
| 19.5 | 29,586,371 | | 0.0000 | 1.0000 | 96.10 |
| 20.5 | 29,586,371 | 459,085 | 0.0155 | 0.9845 | 96.10 |
| 21.5 | 29,127,286 | | 0.0000 | 1.0000 | 94.61 |
| 22.5 | 29,127,286 | | 0.0000 | 1.0000 | 94.61 |
| 23.5 | 16,056,519 | 203,409 | 0.0127 | 0.9873 | 94.61 |
| 24.5 | 15,853,110 | | 0.0000 | 1.0000 | 93.41 |
| 25.5 | 15,853,110 | 2,243,280 | 0.1415 | 0.8585 | 93.41 |
| 26.5 | 13,526,225 | | 0.0000 | 1.0000 | 80.19 |
| 27.5 | 13,526,225 | | 0.0000 | 1.0000 | 80.19 |
| 28.5 | 13,501,580 | | 0.0000 | 1.0000 | 80.19 |
| 29.5 | 13,501,580 | | 0.0000 | 1.0000 | 80.19 |
| 30.5 | 13,501,580 | | 0.0000 | 1.0000 | 80.19 |
| 31.5 | 13,501,580 | | 0.0000 | 1.0000 | 80.19 |
| 32.5 | 13,501,580 | | 0.0000 | 1.0000 | 80.19 |
| 33.5 | 13,501,580 | | 0.0000 | 1.0000 | 80.19 |
| 34.5 | 13,290,970 | | 0.0000 | 1.0000 | 80.19 |
| 35.5 | 13,290,970 | | 0.0000 | 1.0000 | 80.19 |
| 36.5 | 13,290,970 | 30,595 | 0.0023 | 0.9977 | 80.19 |
| 37.5 | 13,260,375 | | 0.0000 | 1.0000 | 80.01 |
| 38.5 | 12,876,356 | 1,144,769 | 0.0889 | 0.9111 | 80.01 |

NEWFOUNDLAND AND LABRADOR HYDRO

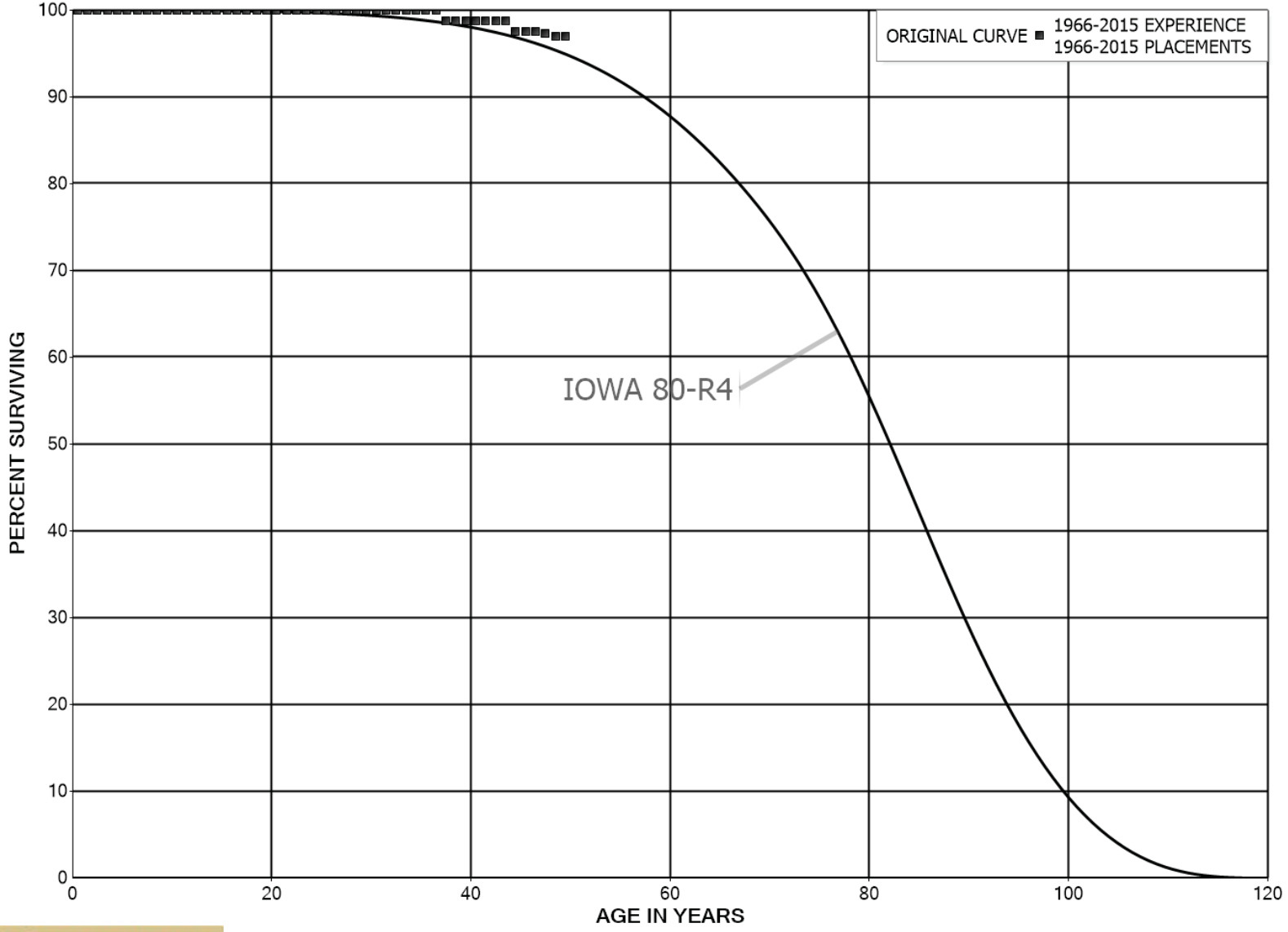
ACCOUNT G01 - GAS TURBINE SYSTEMS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 11,731,587 | | 0.0000 | 1.0000 | 72.89 |
| 40.5 | 5,699,814 | | 0.0000 | 1.0000 | 72.89 |
| 41.5 | 995,759 | | 0.0000 | 1.0000 | 72.89 |
| 42.5 | 995,759 | | 0.0000 | 1.0000 | 72.89 |
| 43.5 | 995,759 | | 0.0000 | 1.0000 | 72.89 |
| 44.5 | 995,759 | | 0.0000 | 1.0000 | 72.89 |
| 45.5 | 995,759 | | 0.0000 | 1.0000 | 72.89 |
| 46.5 | 995,759 | | 0.0000 | 1.0000 | 72.89 |
| 47.5 | | | | | 72.89 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT G02 - GATES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G02 - GATES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 19,165,290 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 17,747,770 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 17,426,122 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 15,500,388 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 15,468,388 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 15,468,388 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 15,468,388 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 15,468,388 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 15,468,388 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 15,468,388 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 15,468,388 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 15,468,388 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 15,029,276 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 15,029,276 | 9,500 | 0.0006 | 0.9994 | 100.00 |
| 13.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 14.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 15.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 16.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 17.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 18.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 19.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 20.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 21.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 22.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 23.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 24.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 25.5 | 15,019,776 | | 0.0000 | 1.0000 | 99.94 |
| 26.5 | 14,839,446 | | 0.0000 | 1.0000 | 99.94 |
| 27.5 | 13,824,563 | | 0.0000 | 1.0000 | 99.94 |
| 28.5 | 13,824,563 | | 0.0000 | 1.0000 | 99.94 |
| 29.5 | 13,685,101 | | 0.0000 | 1.0000 | 99.94 |
| 30.5 | 13,499,888 | 170 | 0.0000 | 1.0000 | 99.94 |
| 31.5 | 12,379,584 | | 0.0000 | 1.0000 | 99.94 |
| 32.5 | 10,403,078 | | 0.0000 | 1.0000 | 99.94 |
| 33.5 | 6,279,829 | | 0.0000 | 1.0000 | 99.94 |
| 34.5 | 6,279,829 | | 0.0000 | 1.0000 | 99.94 |
| 35.5 | 5,228,337 | | 0.0000 | 1.0000 | 99.94 |
| 36.5 | 3,809,007 | 46,760 | 0.0123 | 0.9877 | 99.94 |
| 37.5 | 3,494,554 | | 0.0000 | 1.0000 | 98.71 |
| 38.5 | 3,494,554 | | 0.0000 | 1.0000 | 98.71 |

NEWFOUNDLAND AND LABRADOR HYDRO

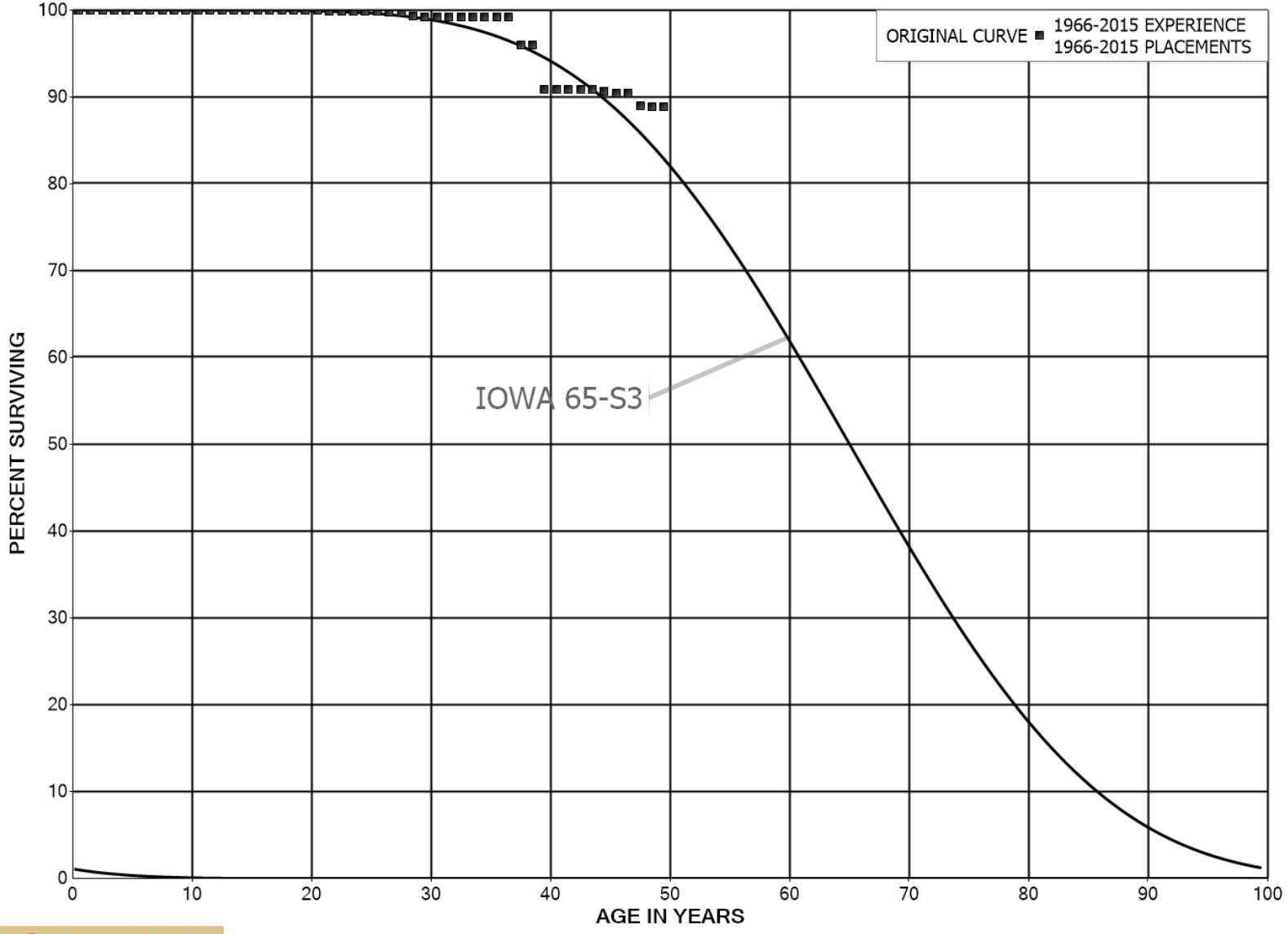
ACCOUNT G02 - GATES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 3,494,554 | | 0.0000 | 1.0000 | 98.71 |
| 40.5 | 3,494,554 | | 0.0000 | 1.0000 | 98.71 |
| 41.5 | 3,494,554 | | 0.0000 | 1.0000 | 98.71 |
| 42.5 | 3,494,554 | | 0.0000 | 1.0000 | 98.71 |
| 43.5 | 3,494,554 | 42,000 | 0.0120 | 0.9880 | 98.71 |
| 44.5 | 3,452,554 | 425 | 0.0001 | 0.9999 | 97.52 |
| 45.5 | 3,055,727 | 1,218 | 0.0004 | 0.9996 | 97.51 |
| 46.5 | 3,054,510 | 5,408 | 0.0018 | 0.9982 | 97.47 |
| 47.5 | 3,049,102 | 10,366 | 0.0034 | 0.9966 | 97.30 |
| 48.5 | 1,987,063 | 910 | 0.0005 | 0.9995 | 96.97 |
| 49.5 | | | | | 96.92 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT G03 - GENERATORS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G03 - GENERATORS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 111,858,702 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 79,442,981 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 72,374,115 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 69,234,533 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 67,267,295 | 4,146 | 0.0001 | 0.9999 | 100.00 |
| 4.5 | 66,812,388 | 0 | 0.0000 | 1.0000 | 99.99 |
| 5.5 | 64,860,626 | | 0.0000 | 1.0000 | 99.99 |
| 6.5 | 64,625,861 | | 0.0000 | 1.0000 | 99.99 |
| 7.5 | 62,337,507 | | 0.0000 | 1.0000 | 99.99 |
| 8.5 | 62,309,499 | 844 | 0.0000 | 1.0000 | 99.99 |
| 9.5 | 62,308,654 | | 0.0000 | 1.0000 | 99.99 |
| 10.5 | 62,308,654 | | 0.0000 | 1.0000 | 99.99 |
| 11.5 | 62,308,654 | | 0.0000 | 1.0000 | 99.99 |
| 12.5 | 52,323,128 | | 0.0000 | 1.0000 | 99.99 |
| 13.5 | 52,286,260 | | 0.0000 | 1.0000 | 99.99 |
| 14.5 | 52,189,246 | 1,025 | 0.0000 | 1.0000 | 99.99 |
| 15.5 | 52,188,221 | | 0.0000 | 1.0000 | 99.99 |
| 16.5 | 52,022,321 | | 0.0000 | 1.0000 | 99.99 |
| 17.5 | 52,022,321 | | 0.0000 | 1.0000 | 99.99 |
| 18.5 | 52,022,321 | 16,211 | 0.0003 | 0.9997 | 99.99 |
| 19.5 | 52,006,109 | | 0.0000 | 1.0000 | 99.96 |
| 20.5 | 52,006,109 | 64,978 | 0.0012 | 0.9988 | 99.96 |
| 21.5 | 51,941,131 | 7,928 | 0.0002 | 0.9998 | 99.83 |
| 22.5 | 51,933,202 | | 0.0000 | 1.0000 | 99.82 |
| 23.5 | 46,839,338 | | 0.0000 | 1.0000 | 99.82 |
| 24.5 | 46,839,338 | | 0.0000 | 1.0000 | 99.82 |
| 25.5 | 46,666,228 | 52,026 | 0.0011 | 0.9989 | 99.82 |
| 26.5 | 45,412,789 | | 0.0000 | 1.0000 | 99.71 |
| 27.5 | 45,335,797 | 214,354 | 0.0047 | 0.9953 | 99.71 |
| 28.5 | 45,120,595 | 43,627 | 0.0010 | 0.9990 | 99.24 |
| 29.5 | 45,076,969 | 1,839 | 0.0000 | 1.0000 | 99.14 |
| 30.5 | 35,850,861 | | 0.0000 | 1.0000 | 99.14 |
| 31.5 | 35,850,861 | | 0.0000 | 1.0000 | 99.14 |
| 32.5 | 35,673,506 | | 0.0000 | 1.0000 | 99.14 |
| 33.5 | 30,001,748 | 2,961 | 0.0001 | 0.9999 | 99.14 |
| 34.5 | 29,998,786 | | 0.0000 | 1.0000 | 99.13 |
| 35.5 | 17,961,479 | | 0.0000 | 1.0000 | 99.13 |
| 36.5 | 17,175,463 | 554,625 | 0.0323 | 0.9677 | 99.13 |
| 37.5 | 16,349,838 | | 0.0000 | 1.0000 | 95.93 |
| 38.5 | 13,164,067 | 698,546 | 0.0531 | 0.9469 | 95.93 |

NEWFOUNDLAND AND LABRADOR HYDRO

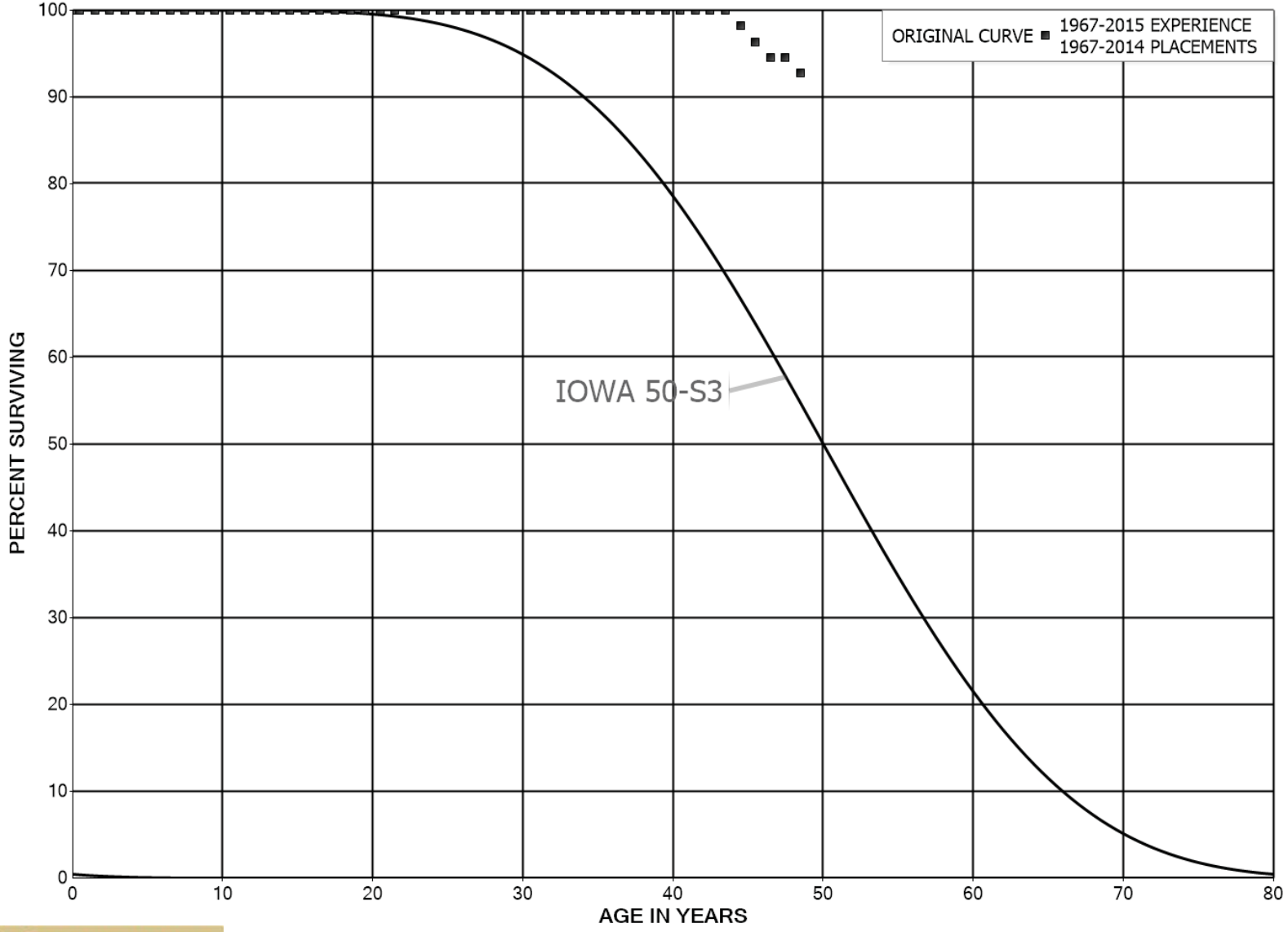
ACCOUNT G03 - GENERATORS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 12,465,521 | | 0.0000 | 1.0000 | 90.84 |
| 40.5 | 12,465,521 | | 0.0000 | 1.0000 | 90.84 |
| 41.5 | 12,465,521 | | 0.0000 | 1.0000 | 90.84 |
| 42.5 | 12,465,521 | | 0.0000 | 1.0000 | 90.84 |
| 43.5 | 12,465,521 | 32,540 | 0.0026 | 0.9974 | 90.84 |
| 44.5 | 10,845,051 | 20,889 | 0.0019 | 0.9981 | 90.60 |
| 45.5 | 7,376,884 | | 0.0000 | 1.0000 | 90.42 |
| 46.5 | 7,376,884 | 124,689 | 0.0169 | 0.9831 | 90.42 |
| 47.5 | 1,723,534 | 734 | 0.0004 | 0.9996 | 88.90 |
| 48.5 | 18,140 | | 0.0000 | 1.0000 | 88.86 |
| 49.5 | | | | | 88.86 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT G04 - GENERATORS - WINDINGS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G04 - GENERATORS - WINDINGS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2014 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 25,122,055 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 25,122,055 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 22,989,529 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 15,242,801 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 11,360,350 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 11,360,350 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

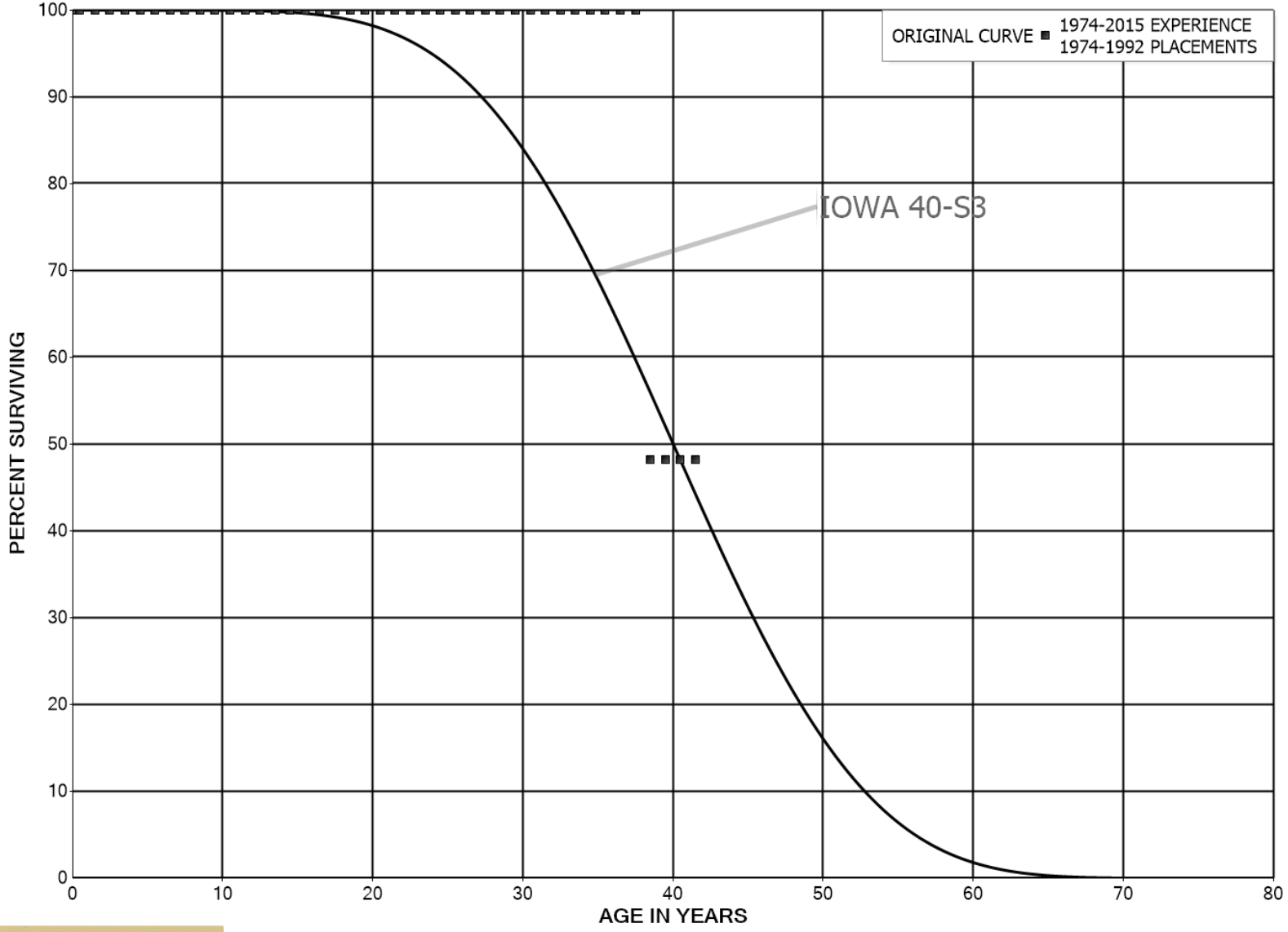
ACCOUNT G04 - GENERATORS - WINDINGS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2014 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 40.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 41.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 42.5 | 6,924,795 | | 0.0000 | 1.0000 | 100.00 |
| 43.5 | 6,924,795 | 126,824 | 0.0183 | 0.9817 | 100.00 |
| 44.5 | 6,797,971 | 126,824 | 0.0187 | 0.9813 | 98.17 |
| 45.5 | 6,671,146 | 126,824 | 0.0190 | 0.9810 | 96.34 |
| 46.5 | 6,544,322 | | 0.0000 | 1.0000 | 94.51 |
| 47.5 | 6,544,322 | 126,824 | 0.0194 | 0.9806 | 94.51 |
| 48.5 | | | | | 92.67 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT G05 - GLYCOL SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G05 - GLYCOL SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1974-1992 EXPERIENCE BAND 1974-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 620,704 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 183,019 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 183,019 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 183,019 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 173,749 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 173,749 | 90,050 | 0.5183 | 0.4817 | 100.00 |
| 38.5 | 83,699 | | 0.0000 | 1.0000 | 48.17 |

NEWFOUNDLAND AND LABRADOR HYDRO

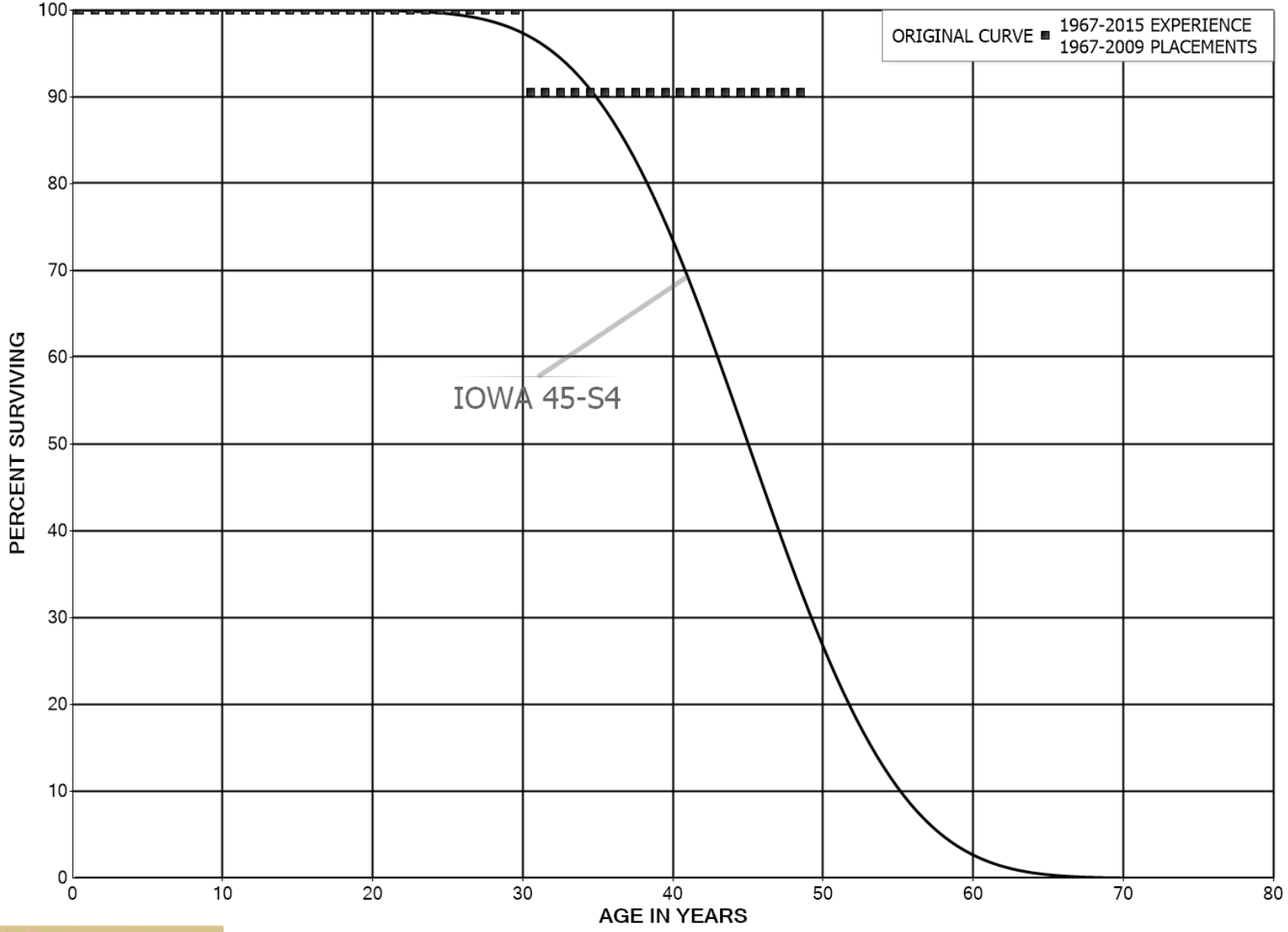
ACCOUNT G05 - GLYCOL SYSTEMS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1974-1992 EXPERIENCE BAND 1974-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 83,699 | | 0.0000 | 1.0000 | 48.17 |
| 40.5 | 83,699 | | 0.0000 | 1.0000 | 48.17 |
| 41.5 | | | | | 48.17 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT G06 - GOVENORS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G06 - GOVENORS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2009 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 10,471,294 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 10,471,294 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 10,471,294 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 10,471,294 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 10,471,294 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 10,471,294 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 10,471,294 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 9,176,079 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 9,176,079 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 9,176,079 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 8,263,566 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 8,263,566 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 8,263,566 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 6,637,157 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 6,042,522 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 6,042,522 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 6,042,522 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 5,119,741 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 5,119,741 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 5,119,741 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 5,108,302 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 5,108,302 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 5,108,302 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 5,108,302 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 5,108,302 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 5,108,302 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 5,108,302 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 5,108,302 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 5,108,302 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 5,108,302 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 5,108,302 | 486,252 | 0.0952 | 0.9048 | 100.00 |
| 30.5 | 3,199,933 | | 0.0000 | 1.0000 | 90.48 |
| 31.5 | 3,199,933 | | 0.0000 | 1.0000 | 90.48 |
| 32.5 | 3,199,933 | | 0.0000 | 1.0000 | 90.48 |
| 33.5 | 894,084 | | 0.0000 | 1.0000 | 90.48 |
| 34.5 | 894,084 | | 0.0000 | 1.0000 | 90.48 |
| 35.5 | 424,738 | | 0.0000 | 1.0000 | 90.48 |
| 36.5 | 424,738 | | 0.0000 | 1.0000 | 90.48 |
| 37.5 | 424,738 | | 0.0000 | 1.0000 | 90.48 |
| 38.5 | 281,513 | | 0.0000 | 1.0000 | 90.48 |

NEWFOUNDLAND AND LABRADOR HYDRO

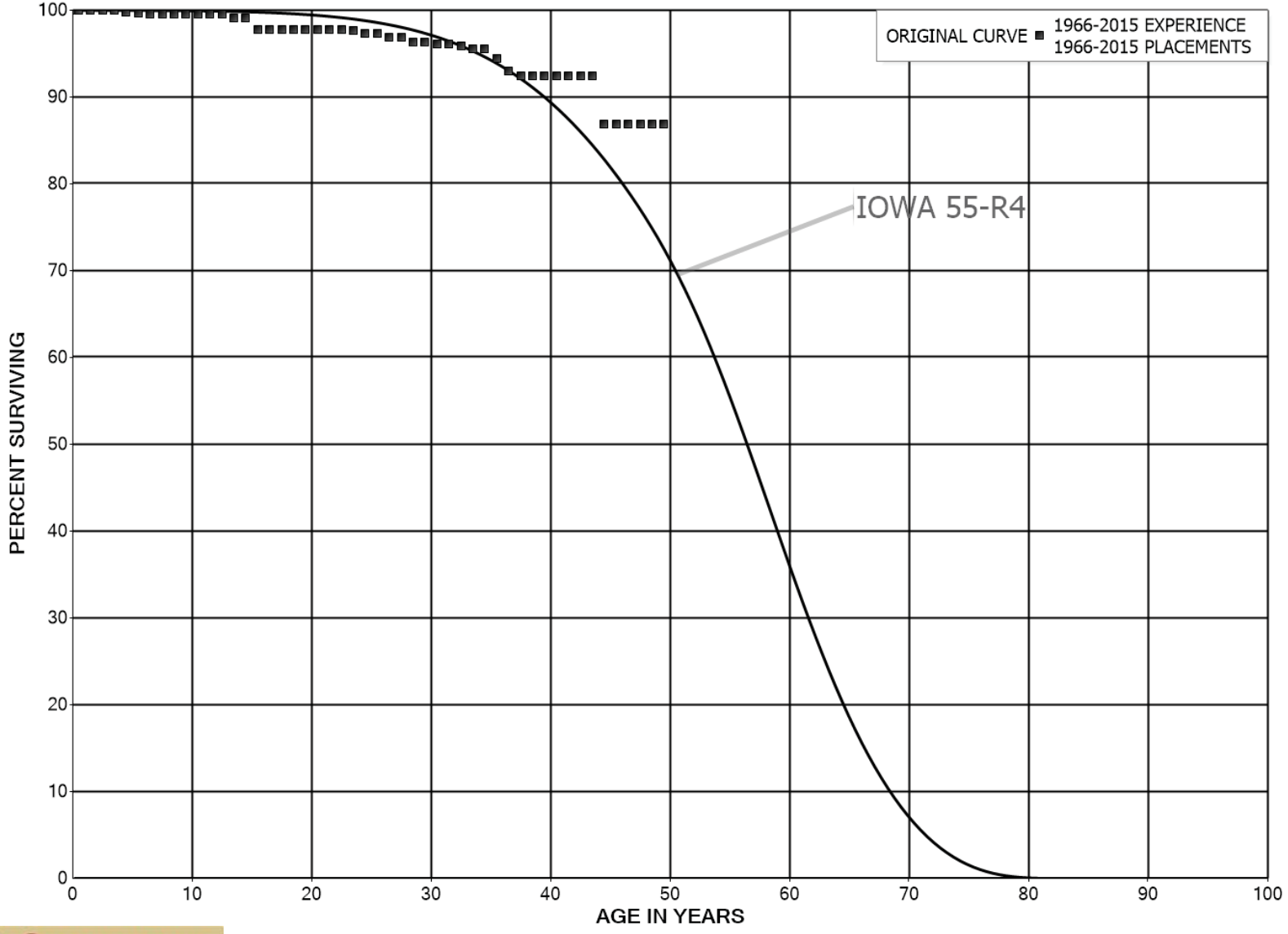
ACCOUNT G06 - GOVENORS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2009 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 281,513 | | 0.0000 | 1.0000 | 90.48 |
| 40.5 | 281,513 | | 0.0000 | 1.0000 | 90.48 |
| 41.5 | 281,513 | | 0.0000 | 1.0000 | 90.48 |
| 42.5 | 281,513 | | 0.0000 | 1.0000 | 90.48 |
| 43.5 | 281,513 | | 0.0000 | 1.0000 | 90.48 |
| 44.5 | 203,784 | | 0.0000 | 1.0000 | 90.48 |
| 45.5 | 139,962 | | 0.0000 | 1.0000 | 90.48 |
| 46.5 | 139,962 | | 0.0000 | 1.0000 | 90.48 |
| 47.5 | 62,233 | | 0.0000 | 1.0000 | 90.48 |
| 48.5 | | | | | 90.48 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT G07 - GROUND WIRE SYSTEM
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G07 - GROUND WIRE SYSTEM

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 10,655,699 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 10,087,501 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 9,546,185 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 8,903,324 | 2,405 | 0.0003 | 0.9997 | 100.00 |
| 3.5 | 8,158,963 | 23,099 | 0.0028 | 0.9972 | 99.97 |
| 4.5 | 7,858,588 | 2,351 | 0.0003 | 0.9997 | 99.69 |
| 5.5 | 7,588,514 | 11,099 | 0.0015 | 0.9985 | 99.66 |
| 6.5 | 7,402,576 | 2,960 | 0.0004 | 0.9996 | 99.51 |
| 7.5 | 6,346,757 | | 0.0000 | 1.0000 | 99.47 |
| 8.5 | 6,346,757 | | 0.0000 | 1.0000 | 99.47 |
| 9.5 | 6,276,529 | 510 | 0.0001 | 0.9999 | 99.47 |
| 10.5 | 6,256,087 | | 0.0000 | 1.0000 | 99.47 |
| 11.5 | 6,246,646 | | 0.0000 | 1.0000 | 99.47 |
| 12.5 | 5,838,094 | 21,116 | 0.0036 | 0.9964 | 99.47 |
| 13.5 | 5,753,109 | | 0.0000 | 1.0000 | 99.11 |
| 14.5 | 5,399,745 | 73,158 | 0.0135 | 0.9865 | 99.11 |
| 15.5 | 5,217,387 | 51 | 0.0000 | 1.0000 | 97.76 |
| 16.5 | 5,217,336 | 806 | 0.0002 | 0.9998 | 97.76 |
| 17.5 | 5,188,571 | | 0.0000 | 1.0000 | 97.75 |
| 18.5 | 5,160,918 | | 0.0000 | 1.0000 | 97.75 |
| 19.5 | 5,018,364 | | 0.0000 | 1.0000 | 97.75 |
| 20.5 | 4,602,965 | | 0.0000 | 1.0000 | 97.75 |
| 21.5 | 4,597,352 | | 0.0000 | 1.0000 | 97.75 |
| 22.5 | 4,586,032 | 6,802 | 0.0015 | 0.9985 | 97.75 |
| 23.5 | 4,364,218 | 12,497 | 0.0029 | 0.9971 | 97.60 |
| 24.5 | 3,830,834 | 230 | 0.0001 | 0.9999 | 97.32 |
| 25.5 | 3,361,807 | 17,549 | 0.0052 | 0.9948 | 97.32 |
| 26.5 | 3,061,231 | | 0.0000 | 1.0000 | 96.81 |
| 27.5 | 3,017,215 | 16,470 | 0.0055 | 0.9945 | 96.81 |
| 28.5 | 2,856,723 | 194 | 0.0001 | 0.9999 | 96.28 |
| 29.5 | 2,826,921 | 6,426 | 0.0023 | 0.9977 | 96.27 |
| 30.5 | 2,364,792 | 773 | 0.0003 | 0.9997 | 96.06 |
| 31.5 | 2,364,019 | 4,607 | 0.0019 | 0.9981 | 96.02 |
| 32.5 | 2,007,180 | 6,833 | 0.0034 | 0.9966 | 95.84 |
| 33.5 | 1,653,358 | 281 | 0.0002 | 0.9998 | 95.51 |
| 34.5 | 1,580,951 | 19,030 | 0.0120 | 0.9880 | 95.49 |
| 35.5 | 1,192,468 | 17,206 | 0.0144 | 0.9856 | 94.35 |
| 36.5 | 1,098,806 | 6,546 | 0.0060 | 0.9940 | 92.98 |
| 37.5 | 854,782 | | 0.0000 | 1.0000 | 92.43 |
| 38.5 | 810,716 | | 0.0000 | 1.0000 | 92.43 |

NEWFOUNDLAND AND LABRADOR HYDRO

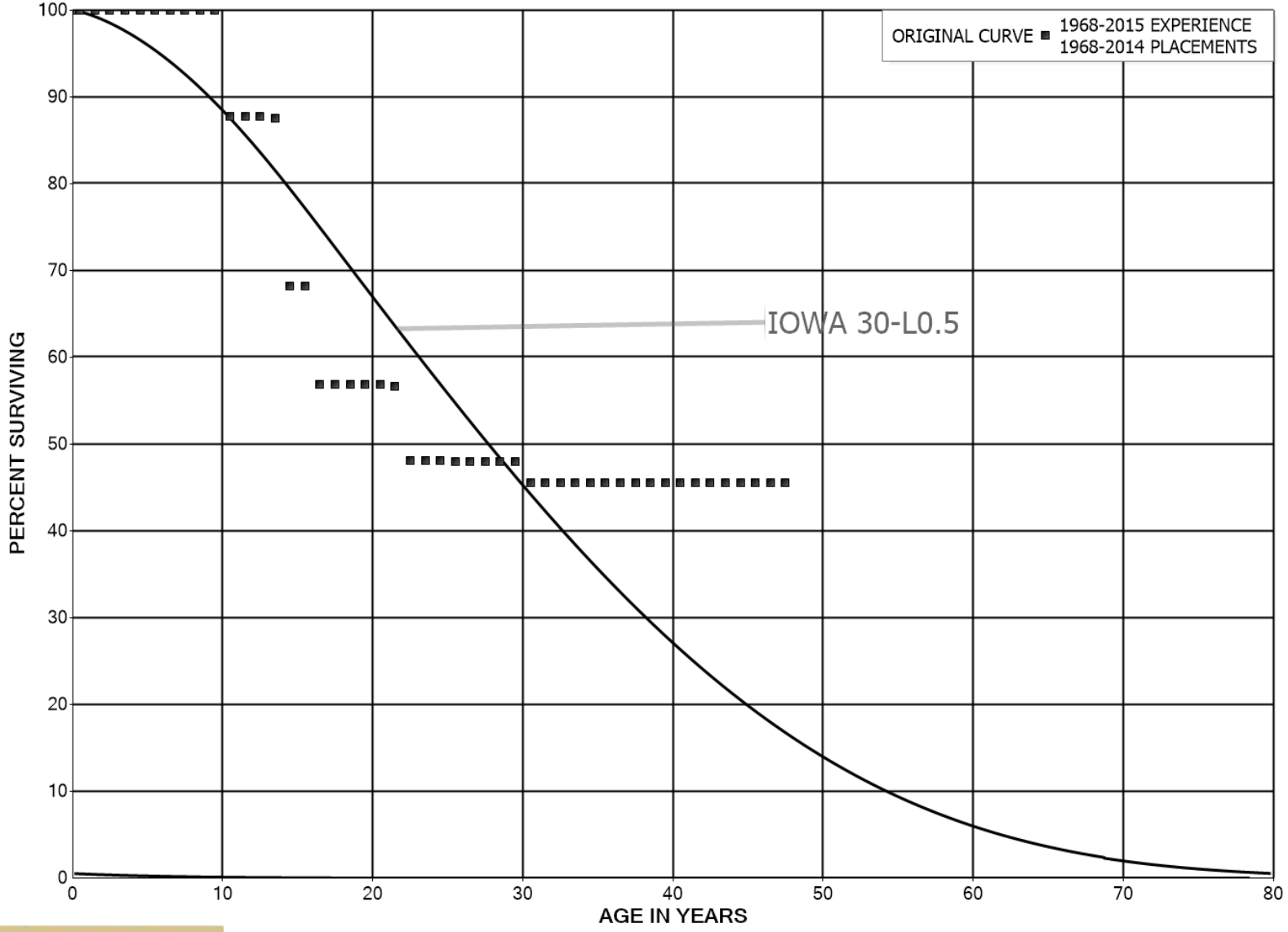
ACCOUNT G07 - GROUND WIRE SYSTEM

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 806,093 | 23 | 0.0000 | 1.0000 | 92.43 |
| 40.5 | 758,178 | 20 | 0.0000 | 1.0000 | 92.43 |
| 41.5 | 536,557 | | 0.0000 | 1.0000 | 92.43 |
| 42.5 | 536,557 | | 0.0000 | 1.0000 | 92.43 |
| 43.5 | 536,557 | 32,306 | 0.0602 | 0.9398 | 92.43 |
| 44.5 | 451,178 | | 0.0000 | 1.0000 | 86.86 |
| 45.5 | 278,958 | | 0.0000 | 1.0000 | 86.86 |
| 46.5 | 278,958 | | 0.0000 | 1.0000 | 86.86 |
| 47.5 | 184,040 | | 0.0000 | 1.0000 | 86.86 |
| 48.5 | 2,824 | | 0.0000 | 1.0000 | 86.86 |
| 49.5 | | | | | 86.86 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT I02 - INSTRUMENTATION
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT I02 - INSTRUMENTATION

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2014 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 22,261,230 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 22,261,230 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 21,913,559 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 21,913,559 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 21,868,188 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 21,868,188 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 21,868,188 | 3,719 | 0.0002 | 0.9998 | 100.00 |
| 6.5 | 21,446,139 | | 0.0000 | 1.0000 | 99.98 |
| 7.5 | 21,101,401 | | 0.0000 | 1.0000 | 99.98 |
| 8.5 | 21,101,401 | | 0.0000 | 1.0000 | 99.98 |
| 9.5 | 20,604,043 | 2,527,190 | 0.1227 | 0.8773 | 99.98 |
| 10.5 | 16,873,034 | | 0.0000 | 1.0000 | 87.72 |
| 11.5 | 15,233,831 | | 0.0000 | 1.0000 | 87.72 |
| 12.5 | 15,233,831 | 45,673 | 0.0030 | 0.9970 | 87.72 |
| 13.5 | 15,169,709 | 3,351,016 | 0.2209 | 0.7791 | 87.46 |
| 14.5 | 11,818,693 | | 0.0000 | 1.0000 | 68.14 |
| 15.5 | 11,818,693 | 1,953,783 | 0.1653 | 0.8347 | 68.14 |
| 16.5 | 9,508,569 | 798 | 0.0001 | 0.9999 | 56.87 |
| 17.5 | 9,507,771 | 7,009 | 0.0007 | 0.9993 | 56.87 |
| 18.5 | 9,500,762 | | 0.0000 | 1.0000 | 56.83 |
| 19.5 | 9,500,762 | | 0.0000 | 1.0000 | 56.83 |
| 20.5 | 9,500,762 | 39,474 | 0.0042 | 0.9958 | 56.83 |
| 21.5 | 8,701,521 | 1,309,202 | 0.1505 | 0.8495 | 56.59 |
| 22.5 | 7,392,319 | | 0.0000 | 1.0000 | 48.08 |
| 23.5 | 7,372,386 | 1,036 | 0.0001 | 0.9999 | 48.08 |
| 24.5 | 7,371,350 | 18,112 | 0.0025 | 0.9975 | 48.07 |
| 25.5 | 6,834,830 | | 0.0000 | 1.0000 | 47.95 |
| 26.5 | 6,783,761 | | 0.0000 | 1.0000 | 47.95 |
| 27.5 | 6,499,007 | | 0.0000 | 1.0000 | 47.95 |
| 28.5 | 6,008,757 | | 0.0000 | 1.0000 | 47.95 |
| 29.5 | 6,008,757 | 309,494 | 0.0515 | 0.9485 | 47.95 |
| 30.5 | 5,699,263 | | 0.0000 | 1.0000 | 45.48 |
| 31.5 | 5,699,263 | | 0.0000 | 1.0000 | 45.48 |
| 32.5 | 5,699,263 | | 0.0000 | 1.0000 | 45.48 |
| 33.5 | 5,699,263 | | 0.0000 | 1.0000 | 45.48 |
| 34.5 | 5,699,263 | | 0.0000 | 1.0000 | 45.48 |
| 35.5 | 3,391,604 | | 0.0000 | 1.0000 | 45.48 |
| 36.5 | 3,366,271 | | 0.0000 | 1.0000 | 45.48 |
| 37.5 | 3,366,271 | | 0.0000 | 1.0000 | 45.48 |
| 38.5 | 3,366,271 | | 0.0000 | 1.0000 | 45.48 |

NEWFOUNDLAND AND LABRADOR HYDRO

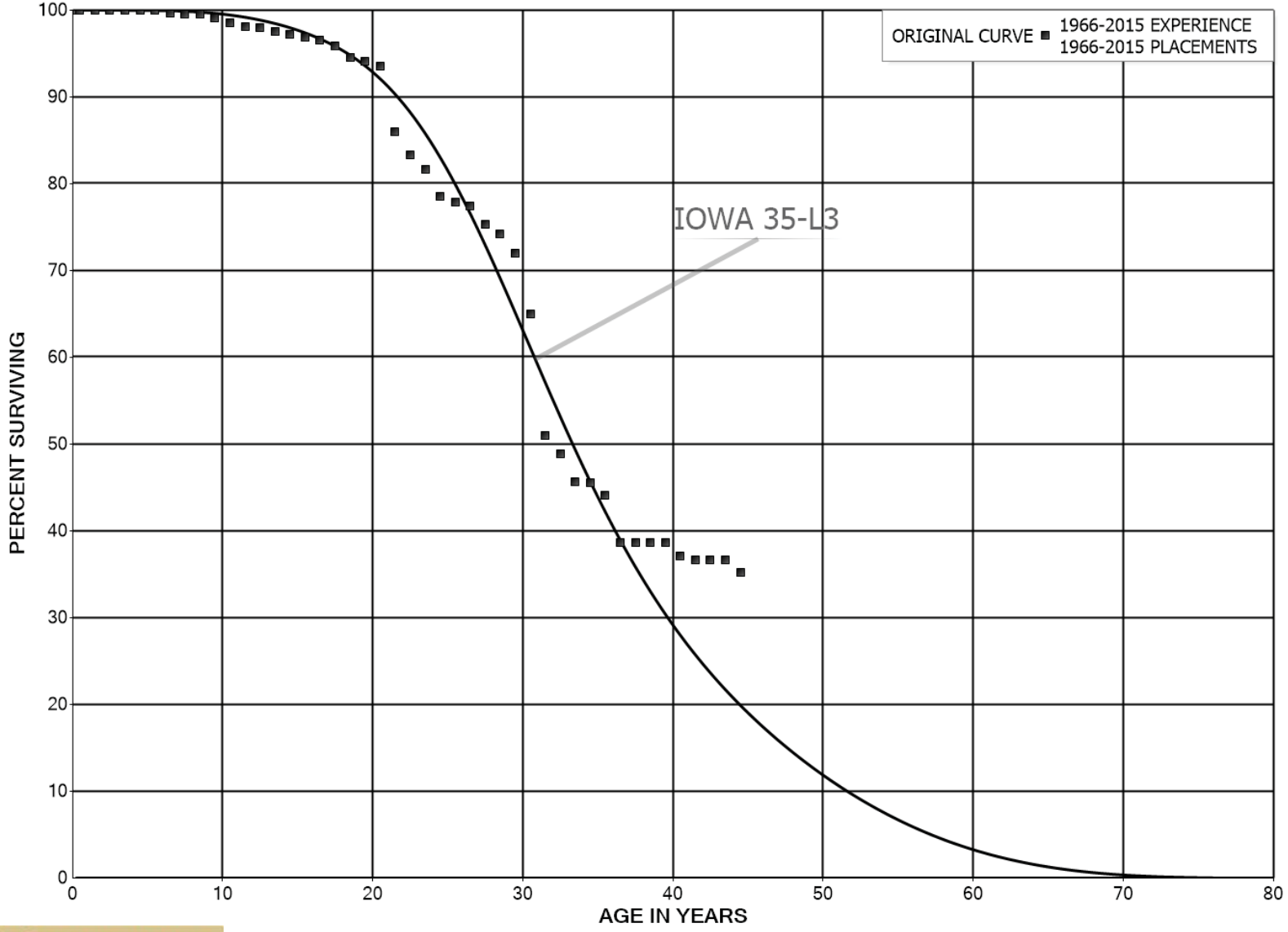
ACCOUNT I02 - INSTRUMENTATION

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2014 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 3,366,271 | | 0.0000 | 1.0000 | 45.48 |
| 40.5 | 3,366,271 | | 0.0000 | 1.0000 | 45.48 |
| 41.5 | 3,366,271 | | 0.0000 | 1.0000 | 45.48 |
| 42.5 | 3,366,271 | | 0.0000 | 1.0000 | 45.48 |
| 43.5 | 3,366,271 | | 0.0000 | 1.0000 | 45.48 |
| 44.5 | 1,803,443 | | 0.0000 | 1.0000 | 45.48 |
| 45.5 | 1,803,443 | | 0.0000 | 1.0000 | 45.48 |
| 46.5 | 1,270,122 | | 0.0000 | 1.0000 | 45.48 |
| 47.5 | | | | | 45.48 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT I03 - INSULATORS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

## ACCOUNT I03 - INSULATORS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 48,242,343 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 48,174,385 | 324 | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 45,488,327 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 45,382,692 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 44,388,624 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 43,897,849 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 43,573,959 | 160,151 | 0.0037 | 0.9963 | 100.00 |
| 6.5 | 41,290,216 | 43,594 | 0.0011 | 0.9989 | 99.63 |
| 7.5 | 40,437,876 | 13,964 | 0.0003 | 0.9997 | 99.53 |
| 8.5 | 37,286,948 | 146,912 | 0.0039 | 0.9961 | 99.49 |
| 9.5 | 35,815,777 | 230,244 | 0.0064 | 0.9936 | 99.10 |
| 10.5 | 35,252,361 | 161,496 | 0.0046 | 0.9954 | 98.46 |
| 11.5 | 32,314,895 | 21,157 | 0.0007 | 0.9993 | 98.01 |
| 12.5 | 30,452,396 | 151,853 | 0.0050 | 0.9950 | 97.95 |
| 13.5 | 28,313,477 | 77,779 | 0.0027 | 0.9973 | 97.46 |
| 14.5 | 27,554,054 | 102,287 | 0.0037 | 0.9963 | 97.19 |
| 15.5 | 23,559,738 | 66,360 | 0.0028 | 0.9972 | 96.83 |
| 16.5 | 22,472,689 | 160,058 | 0.0071 | 0.9929 | 96.56 |
| 17.5 | 21,592,182 | 305,202 | 0.0141 | 0.9859 | 95.87 |
| 18.5 | 20,397,103 | 95,844 | 0.0047 | 0.9953 | 94.52 |
| 19.5 | 18,514,891 | 116,445 | 0.0063 | 0.9937 | 94.07 |
| 20.5 | 16,639,757 | 1,340,429 | 0.0806 | 0.9194 | 93.48 |
| 21.5 | 14,330,008 | 448,710 | 0.0313 | 0.9687 | 85.95 |
| 22.5 | 12,691,805 | 258,205 | 0.0203 | 0.9797 | 83.26 |
| 23.5 | 11,665,780 | 439,868 | 0.0377 | 0.9623 | 81.56 |
| 24.5 | 9,525,743 | 75,091 | 0.0079 | 0.9921 | 78.49 |
| 25.5 | 6,237,944 | 38,748 | 0.0062 | 0.9938 | 77.87 |
| 26.5 | 5,598,358 | 149,312 | 0.0267 | 0.9733 | 77.39 |
| 27.5 | 4,873,463 | 73,191 | 0.0150 | 0.9850 | 75.32 |
| 28.5 | 4,266,325 | 132,011 | 0.0309 | 0.9691 | 74.19 |
| 29.5 | 4,126,752 | 396,364 | 0.0960 | 0.9040 | 71.90 |
| 30.5 | 2,731,213 | 591,635 | 0.2166 | 0.7834 | 64.99 |
| 31.5 | 2,069,541 | 85,526 | 0.0413 | 0.9587 | 50.91 |
| 32.5 | 1,353,535 | 88,424 | 0.0653 | 0.9347 | 48.81 |
| 33.5 | 838,678 | 1,295 | 0.0015 | 0.9985 | 45.62 |
| 34.5 | 768,363 | 24,135 | 0.0314 | 0.9686 | 45.55 |
| 35.5 | 732,916 | 90,713 | 0.1238 | 0.8762 | 44.12 |
| 36.5 | 627,421 | | 0.0000 | 1.0000 | 38.66 |
| 37.5 | 591,994 | | 0.0000 | 1.0000 | 38.66 |
| 38.5 | 541,711 | | 0.0000 | 1.0000 | 38.66 |

NEWFOUNDLAND AND LABRADOR HYDRO

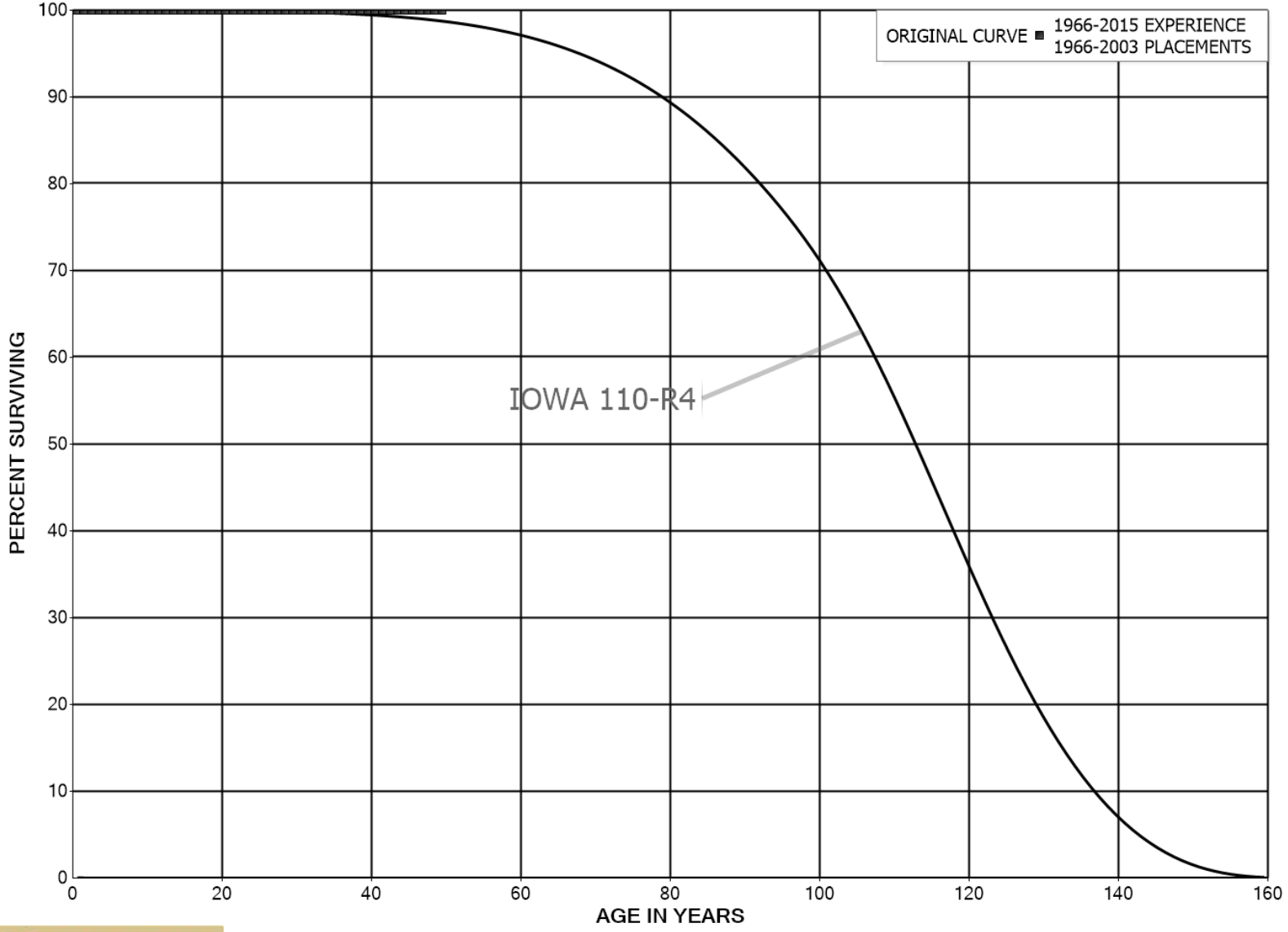
## ACCOUNT I03 - INSULATORS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 529,369 | 21,991 | 0.0415 | 0.9585 | 38.66 |
| 40.5 | 506,864 | 5,271 | 0.0104 | 0.9896 | 37.05 |
| 41.5 | 489,114 | | 0.0000 | 1.0000 | 36.67 |
| 42.5 | 489,114 | 1,243 | 0.0025 | 0.9975 | 36.67 |
| 43.5 | 487,870 | 18,088 | 0.0371 | 0.9629 | 36.57 |
| 44.5 | 469,783 | | 0.0000 | 1.0000 | 35.22 |
| 45.5 | 373,407 | | 0.0000 | 1.0000 | 35.22 |
| 46.5 | 323,008 | 120,099 | 0.3718 | 0.6282 | 35.22 |
| 47.5 | 88,701 | | 0.0000 | 1.0000 | 22.12 |
| 48.5 | | | | | 22.12 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT I04 - INTAKE STRUCTURES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

## ACCOUNT I04 - INTAKE STRUCTURES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2003 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 19,436,445 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 15,526,631 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 15,502,585 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 15,502,585 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 15,502,585 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 15,502,585 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 15,502,585 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 15,492,014 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 15,492,014 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 15,492,014 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 15,486,773 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 15,486,773 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 15,486,773 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 15,486,773 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 15,486,773 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 15,480,004 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 15,480,004 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 15,480,004 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 15,480,004 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 15,480,004 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 12,078,221 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 12,062,216 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 7,022,641 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 7,022,641 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 7,022,641 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

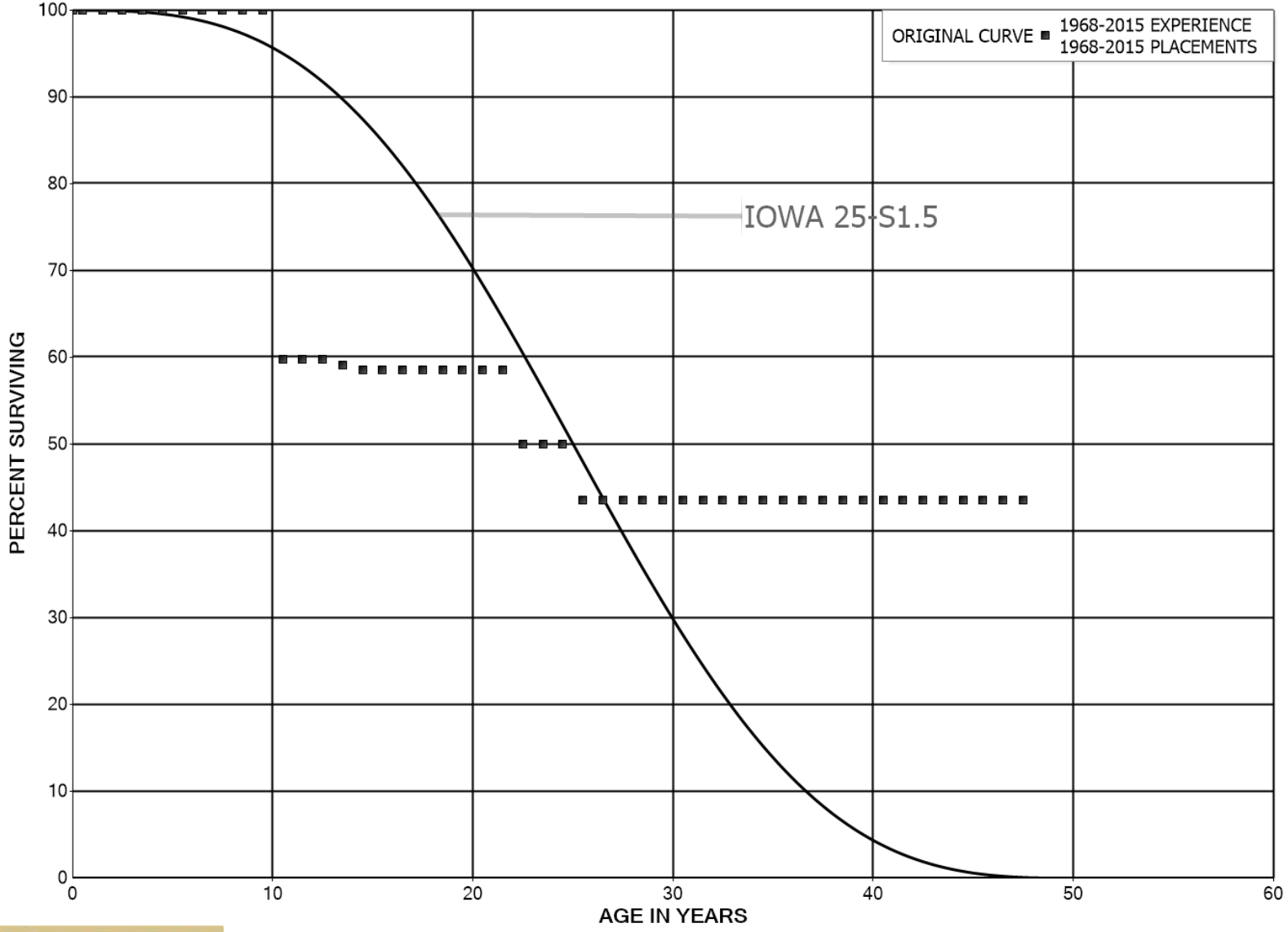
ACCOUNT I04 - INTAKE STRUCTURES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2003 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 40.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 41.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 42.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 43.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 44.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 45.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 46.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 47.5 | 5,568,392 | | 0.0000 | 1.0000 | 100.00 |
| 48.5 | 3,784,392 | | 0.0000 | 1.0000 | 100.00 |
| 49.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT I05 - INVERTERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT I05 – INVERTERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 1,046,068 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 996,264 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 990,621 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 990,621 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 985,656 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 985,656 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 985,656 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 985,656 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 974,645 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 974,645 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 958,372 | 385,595 | 0.4023 | 0.5977 | 100.00 |
| 10.5 | 570,437 | | 0.0000 | 1.0000 | 59.77 |
| 11.5 | 570,437 | | 0.0000 | 1.0000 | 59.77 |
| 12.5 | 570,437 | 6,319 | 0.0111 | 0.9889 | 59.77 |
| 13.5 | 564,119 | 5,824 | 0.0103 | 0.9897 | 59.10 |
| 14.5 | 447,339 | | 0.0000 | 1.0000 | 58.49 |
| 15.5 | 416,460 | | 0.0000 | 1.0000 | 58.49 |
| 16.5 | 416,460 | | 0.0000 | 1.0000 | 58.49 |
| 17.5 | 416,460 | | 0.0000 | 1.0000 | 58.49 |
| 18.5 | 416,460 | | 0.0000 | 1.0000 | 58.49 |
| 19.5 | 398,855 | | 0.0000 | 1.0000 | 58.49 |
| 20.5 | 398,855 | | 0.0000 | 1.0000 | 58.49 |
| 21.5 | 398,855 | 58,409 | 0.1464 | 0.8536 | 58.49 |
| 22.5 | 340,446 | | 0.0000 | 1.0000 | 49.93 |
| 23.5 | 340,446 | | 0.0000 | 1.0000 | 49.93 |
| 24.5 | 340,446 | 44,000 | 0.1292 | 0.8708 | 49.93 |
| 25.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 26.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 27.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 28.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 29.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 30.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 31.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 32.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 33.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 34.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 35.5 | 296,446 | | 0.0000 | 1.0000 | 43.47 |
| 36.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |
| 37.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |
| 38.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |

NEWFOUNDLAND AND LABRADOR HYDRO

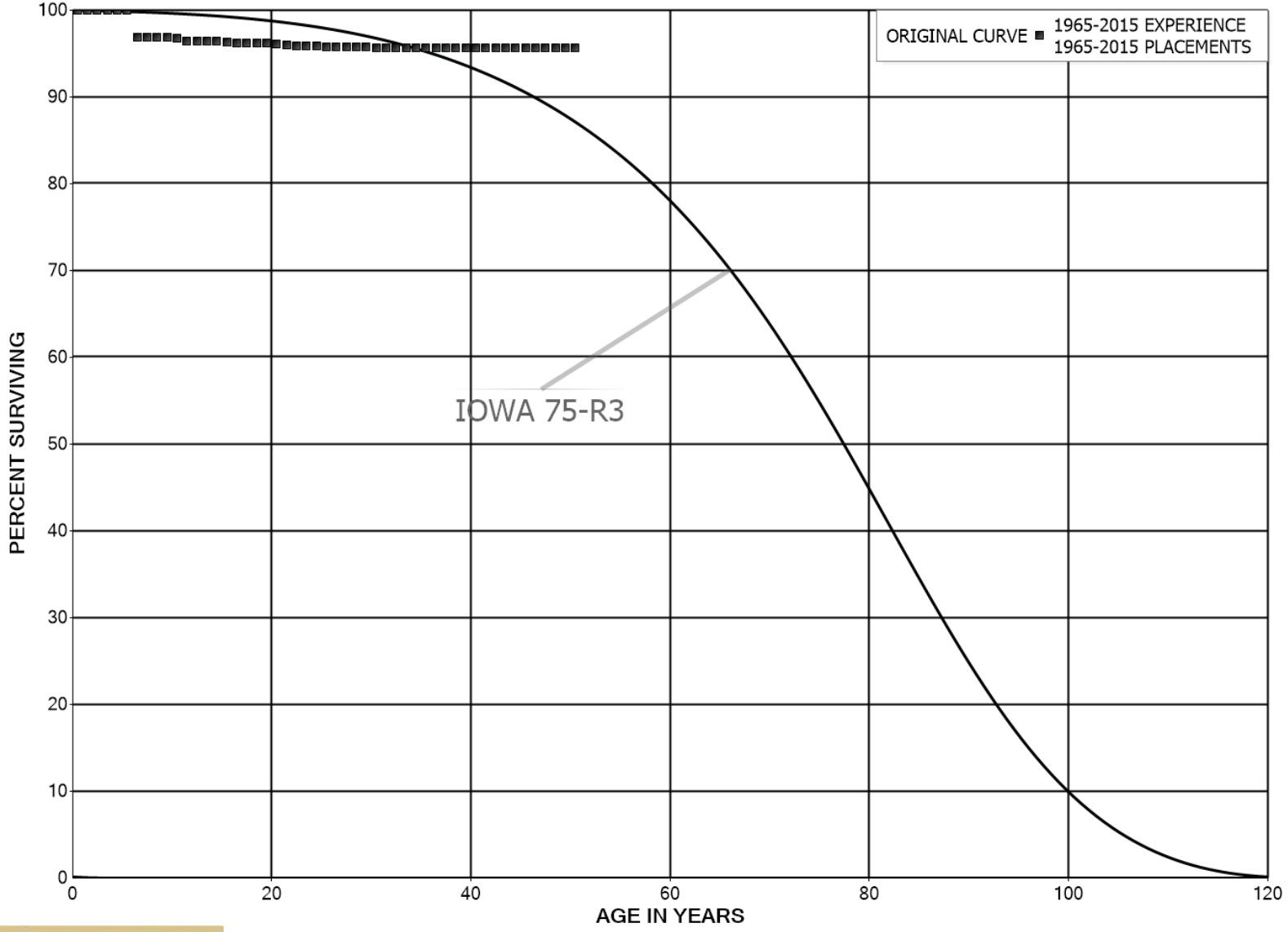
ACCOUNT I05 - INVERTERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |
| 40.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |
| 41.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |
| 42.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |
| 43.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |
| 44.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |
| 45.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |
| 46.5 | 182,291 | | 0.0000 | 1.0000 | 43.47 |
| 47.5 | | | | | 43.47 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT L03 - LAND IMPROVEMENTS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT L03 - LAND IMPROVEMENTS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 14,785,580 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 14,405,219 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 14,035,436 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 14,035,436 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 13,985,752 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 13,920,972 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 13,907,588 | 434,171 | 0.0312 | 0.9688 | 100.00 |
| 6.5 | 13,205,053 | | 0.0000 | 1.0000 | 96.88 |
| 7.5 | 13,140,512 | 3,813 | 0.0003 | 0.9997 | 96.88 |
| 8.5 | 13,136,698 | | 0.0000 | 1.0000 | 96.85 |
| 9.5 | 13,026,208 | 18,971 | 0.0015 | 0.9985 | 96.85 |
| 10.5 | 12,919,808 | 42,480 | 0.0033 | 0.9967 | 96.71 |
| 11.5 | 12,774,710 | | 0.0000 | 1.0000 | 96.39 |
| 12.5 | 12,546,047 | | 0.0000 | 1.0000 | 96.39 |
| 13.5 | 12,373,363 | | 0.0000 | 1.0000 | 96.39 |
| 14.5 | 12,373,363 | 15,446 | 0.0012 | 0.9988 | 96.39 |
| 15.5 | 12,284,887 | 6,107 | 0.0005 | 0.9995 | 96.27 |
| 16.5 | 12,161,087 | 9,618 | 0.0008 | 0.9992 | 96.22 |
| 17.5 | 11,829,964 | 2,739 | 0.0002 | 0.9998 | 96.15 |
| 18.5 | 11,802,786 | | 0.0000 | 1.0000 | 96.12 |
| 19.5 | 11,546,911 | 6,476 | 0.0006 | 0.9994 | 96.12 |
| 20.5 | 11,195,645 | 12,318 | 0.0011 | 0.9989 | 96.07 |
| 21.5 | 10,996,065 | 11,197 | 0.0010 | 0.9990 | 95.96 |
| 22.5 | 10,758,006 | 6,203 | 0.0006 | 0.9994 | 95.87 |
| 23.5 | 10,182,136 | | 0.0000 | 1.0000 | 95.81 |
| 24.5 | 9,741,386 | 5,711 | 0.0006 | 0.9994 | 95.81 |
| 25.5 | 8,969,860 | | 0.0000 | 1.0000 | 95.76 |
| 26.5 | 6,750,871 | | 0.0000 | 1.0000 | 95.76 |
| 27.5 | 6,562,113 | | 0.0000 | 1.0000 | 95.76 |
| 28.5 | 5,992,954 | | 0.0000 | 1.0000 | 95.76 |
| 29.5 | 5,907,424 | 7,420 | 0.0013 | 0.9987 | 95.76 |
| 30.5 | 5,647,615 | | 0.0000 | 1.0000 | 95.64 |
| 31.5 | 5,550,842 | | 0.0000 | 1.0000 | 95.64 |
| 32.5 | 5,290,586 | | 0.0000 | 1.0000 | 95.64 |
| 33.5 | 4,774,341 | | 0.0000 | 1.0000 | 95.64 |
| 34.5 | 4,502,387 | | 0.0000 | 1.0000 | 95.64 |
| 35.5 | 3,449,183 | | 0.0000 | 1.0000 | 95.64 |
| 36.5 | 3,412,057 | | 0.0000 | 1.0000 | 95.64 |
| 37.5 | 2,634,287 | | 0.0000 | 1.0000 | 95.64 |
| 38.5 | 2,242,772 | 350 | 0.0002 | 0.9998 | 95.64 |

NEWFOUNDLAND AND LABRADOR HYDRO

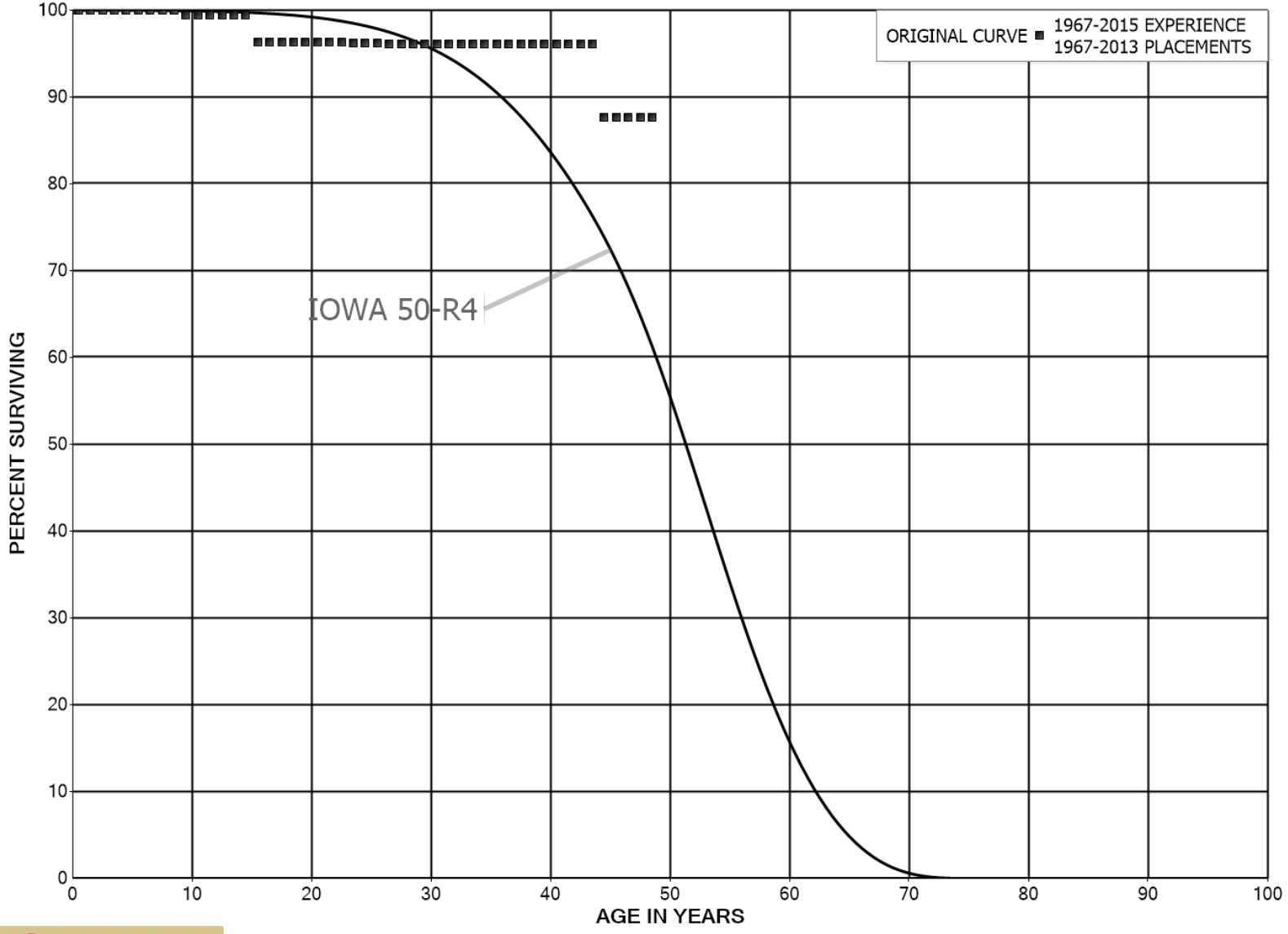
ACCOUNT L03 - LAND IMPROVEMENTS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 2,181,133 | | 0.0000 | 1.0000 | 95.62 |
| 40.5 | 2,121,180 | | 0.0000 | 1.0000 | 95.62 |
| 41.5 | 1,858,787 | | 0.0000 | 1.0000 | 95.62 |
| 42.5 | 1,858,787 | | 0.0000 | 1.0000 | 95.62 |
| 43.5 | 1,572,568 | | 0.0000 | 1.0000 | 95.62 |
| 44.5 | 575,791 | | 0.0000 | 1.0000 | 95.62 |
| 45.5 | 262,197 | | 0.0000 | 1.0000 | 95.62 |
| 46.5 | 262,197 | | 0.0000 | 1.0000 | 95.62 |
| 47.5 | 180,098 | | 0.0000 | 1.0000 | 95.62 |
| 48.5 | 5,754 | | 0.0000 | 1.0000 | 95.62 |
| 49.5 | 5,754 | | 0.0000 | 1.0000 | 95.62 |
| 50.5 | | | | | 95.62 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT L04 - LIGHTING SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT L04 - LIGHTING SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2013 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 961,466 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 961,466 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 961,466 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 703,475 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 610,448 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 610,448 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 610,448 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 610,448 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 610,448 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 610,448 | 3,887 | 0.0064 | 0.9936 | 100.00 |
| 9.5 | 606,561 | | 0.0000 | 1.0000 | 99.36 |
| 10.5 | 606,561 | | 0.0000 | 1.0000 | 99.36 |
| 11.5 | 606,561 | | 0.0000 | 1.0000 | 99.36 |
| 12.5 | 606,561 | | 0.0000 | 1.0000 | 99.36 |
| 13.5 | 606,561 | | 0.0000 | 1.0000 | 99.36 |
| 14.5 | 606,561 | 18,968 | 0.0313 | 0.9687 | 99.36 |
| 15.5 | 587,593 | | 0.0000 | 1.0000 | 96.26 |
| 16.5 | 587,593 | | 0.0000 | 1.0000 | 96.26 |
| 17.5 | 587,593 | | 0.0000 | 1.0000 | 96.26 |
| 18.5 | 587,593 | | 0.0000 | 1.0000 | 96.26 |
| 19.5 | 587,593 | | 0.0000 | 1.0000 | 96.26 |
| 20.5 | 587,593 | | 0.0000 | 1.0000 | 96.26 |
| 21.5 | 587,593 | | 0.0000 | 1.0000 | 96.26 |
| 22.5 | 587,593 | 251 | 0.0004 | 0.9996 | 96.26 |
| 23.5 | 584,606 | | 0.0000 | 1.0000 | 96.21 |
| 24.5 | 565,775 | | 0.0000 | 1.0000 | 96.21 |
| 25.5 | 530,168 | 548 | 0.0010 | 0.9990 | 96.21 |
| 26.5 | 511,596 | | 0.0000 | 1.0000 | 96.12 |
| 27.5 | 501,759 | | 0.0000 | 1.0000 | 96.12 |
| 28.5 | 462,437 | | 0.0000 | 1.0000 | 96.12 |
| 29.5 | 456,580 | | 0.0000 | 1.0000 | 96.12 |
| 30.5 | 453,017 | | 0.0000 | 1.0000 | 96.12 |
| 31.5 | 453,017 | | 0.0000 | 1.0000 | 96.12 |
| 32.5 | 442,026 | | 0.0000 | 1.0000 | 96.12 |
| 33.5 | 408,180 | | 0.0000 | 1.0000 | 96.12 |
| 34.5 | 398,291 | | 0.0000 | 1.0000 | 96.12 |
| 35.5 | 372,390 | | 0.0000 | 1.0000 | 96.12 |
| 36.5 | 288,819 | | 0.0000 | 1.0000 | 96.12 |
| 37.5 | 220,924 | | 0.0000 | 1.0000 | 96.12 |
| 38.5 | 190,964 | | 0.0000 | 1.0000 | 96.12 |

NEWFOUNDLAND AND LABRADOR HYDRO

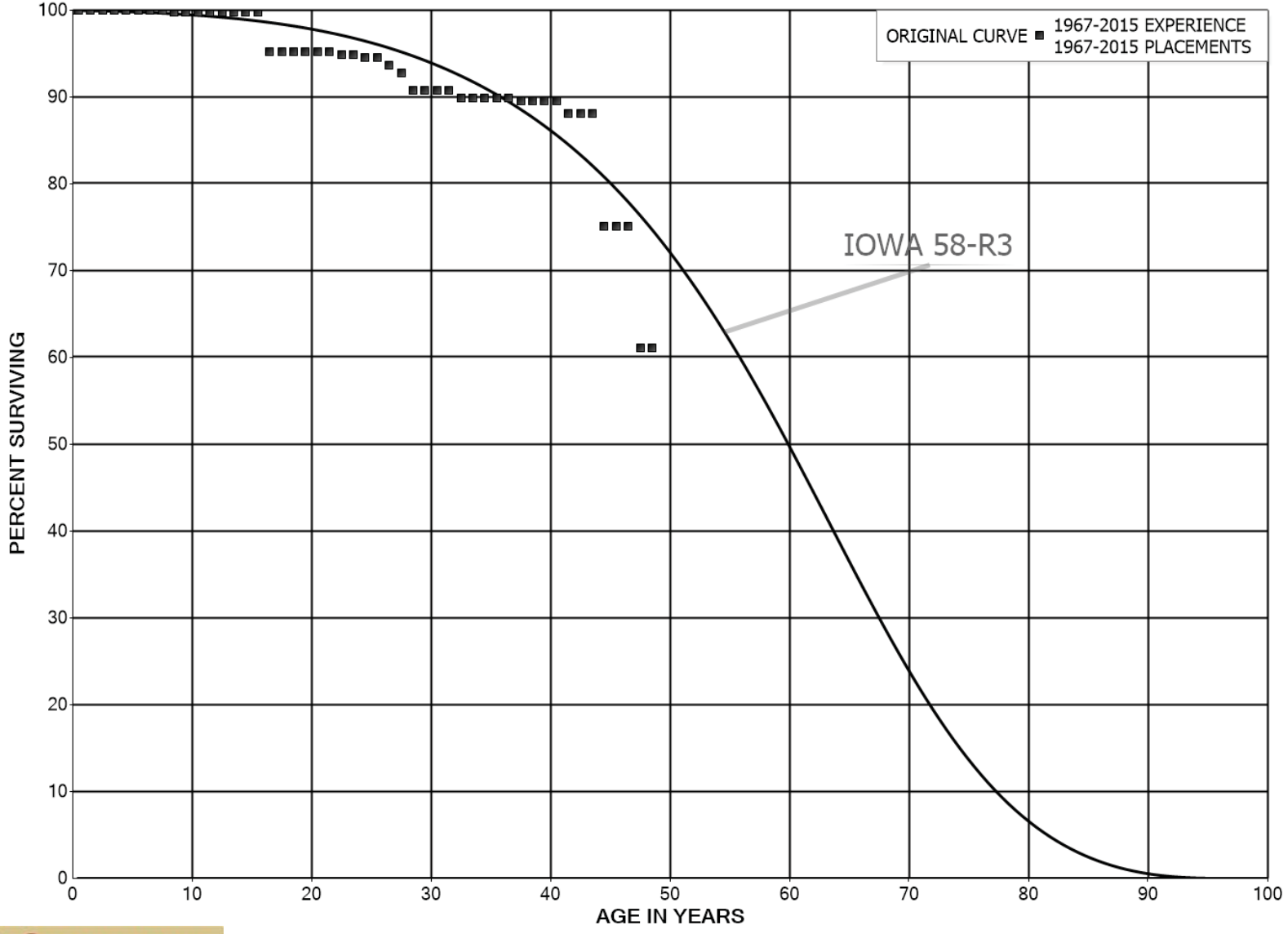
ACCOUNT L04 - LIGHTING SYSTEMS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2013 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 186,557 | | 0.0000 | 1.0000 | 96.12 |
| 40.5 | 146,805 | | 0.0000 | 1.0000 | 96.12 |
| 41.5 | 130,187 | | 0.0000 | 1.0000 | 96.12 |
| 42.5 | 130,187 | | 0.0000 | 1.0000 | 96.12 |
| 43.5 | 130,187 | 11,509 | 0.0884 | 0.9116 | 96.12 |
| 44.5 | 90,452 | | 0.0000 | 1.0000 | 87.62 |
| 45.5 | 47,965 | | 0.0000 | 1.0000 | 87.62 |
| 46.5 | 47,965 | | 0.0000 | 1.0000 | 87.62 |
| 47.5 | 45,238 | | 0.0000 | 1.0000 | 87.62 |
| 48.5 | | | | | 87.62 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT L05 - LIGHTNING ARRESTORS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT L05 - LIGHTNING ARRESTORS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 6,294,940 | 6,388 | 0.0010 | 0.9990 | 100.00 |
| 0.5 | 5,967,202 | 314 | 0.0001 | 0.9999 | 99.90 |
| 1.5 | 5,876,747 | | 0.0000 | 1.0000 | 99.89 |
| 2.5 | 5,859,055 | | 0.0000 | 1.0000 | 99.89 |
| 3.5 | 5,772,890 | | 0.0000 | 1.0000 | 99.89 |
| 4.5 | 5,715,551 | | 0.0000 | 1.0000 | 99.89 |
| 5.5 | 5,692,652 | | 0.0000 | 1.0000 | 99.89 |
| 6.5 | 5,612,650 | | 0.0000 | 1.0000 | 99.89 |
| 7.5 | 5,560,060 | 8,235 | 0.0015 | 0.9985 | 99.89 |
| 8.5 | 5,538,693 | | 0.0000 | 1.0000 | 99.75 |
| 9.5 | 5,448,583 | | 0.0000 | 1.0000 | 99.75 |
| 10.5 | 5,368,864 | | 0.0000 | 1.0000 | 99.75 |
| 11.5 | 5,357,424 | | 0.0000 | 1.0000 | 99.75 |
| 12.5 | 5,357,424 | | 0.0000 | 1.0000 | 99.75 |
| 13.5 | 5,357,424 | | 0.0000 | 1.0000 | 99.75 |
| 14.5 | 5,357,424 | | 0.0000 | 1.0000 | 99.75 |
| 15.5 | 301,716 | 13,947 | 0.0462 | 0.9538 | 99.75 |
| 16.5 | 287,769 | | 0.0000 | 1.0000 | 95.13 |
| 17.5 | 287,769 | | 0.0000 | 1.0000 | 95.13 |
| 18.5 | 287,769 | | 0.0000 | 1.0000 | 95.13 |
| 19.5 | 285,304 | | 0.0000 | 1.0000 | 95.13 |
| 20.5 | 285,304 | | 0.0000 | 1.0000 | 95.13 |
| 21.5 | 282,713 | 944 | 0.0033 | 0.9967 | 95.13 |
| 22.5 | 281,769 | | 0.0000 | 1.0000 | 94.82 |
| 23.5 | 281,769 | 892 | 0.0032 | 0.9968 | 94.82 |
| 24.5 | 280,877 | | 0.0000 | 1.0000 | 94.52 |
| 25.5 | 280,877 | 2,829 | 0.0101 | 0.9899 | 94.52 |
| 26.5 | 277,708 | 2,538 | 0.0091 | 0.9909 | 93.56 |
| 27.5 | 274,358 | 5,754 | 0.0210 | 0.9790 | 92.71 |
| 28.5 | 268,310 | | 0.0000 | 1.0000 | 90.76 |
| 29.5 | 262,608 | | 0.0000 | 1.0000 | 90.76 |
| 30.5 | 262,608 | | 0.0000 | 1.0000 | 90.76 |
| 31.5 | 262,608 | 2,692 | 0.0103 | 0.9897 | 90.76 |
| 32.5 | 259,916 | | 0.0000 | 1.0000 | 89.83 |
| 33.5 | 234,230 | | 0.0000 | 1.0000 | 89.83 |
| 34.5 | 232,163 | | 0.0000 | 1.0000 | 89.83 |
| 35.5 | 231,873 | | 0.0000 | 1.0000 | 89.83 |
| 36.5 | 231,873 | 755 | 0.0033 | 0.9967 | 89.83 |
| 37.5 | 211,893 | | 0.0000 | 1.0000 | 89.54 |
| 38.5 | 211,828 | | 0.0000 | 1.0000 | 89.54 |

NEWFOUNDLAND AND LABRADOR HYDRO

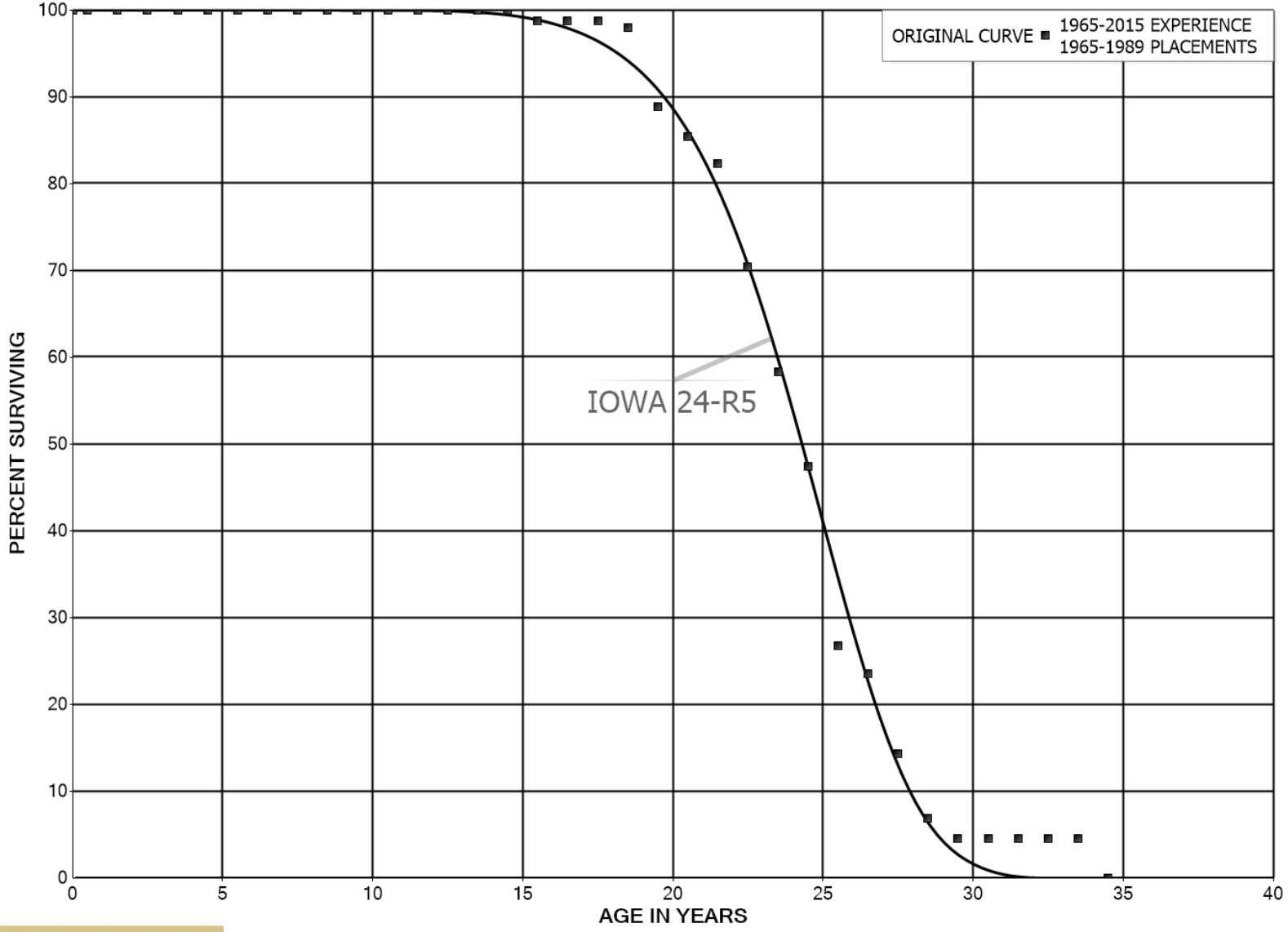
ACCOUNT L05 - LIGHTNING ARRESTORS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 211,828 | | 0.0000 | 1.0000 | 89.54 |
| 40.5 | 211,828 | 3,471 | 0.0164 | 0.9836 | 89.54 |
| 41.5 | 208,357 | | 0.0000 | 1.0000 | 88.07 |
| 42.5 | 208,357 | | 0.0000 | 1.0000 | 88.07 |
| 43.5 | 208,357 | 30,755 | 0.1476 | 0.8524 | 88.07 |
| 44.5 | 177,602 | | 0.0000 | 1.0000 | 75.07 |
| 45.5 | 116,585 | | 0.0000 | 1.0000 | 75.07 |
| 46.5 | 116,585 | 21,815 | 0.1871 | 0.8129 | 75.07 |
| 47.5 | 44,408 | | 0.0000 | 1.0000 | 61.03 |
| 48.5 | | | | | 61.03 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT L06 - LINE COUPLING EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

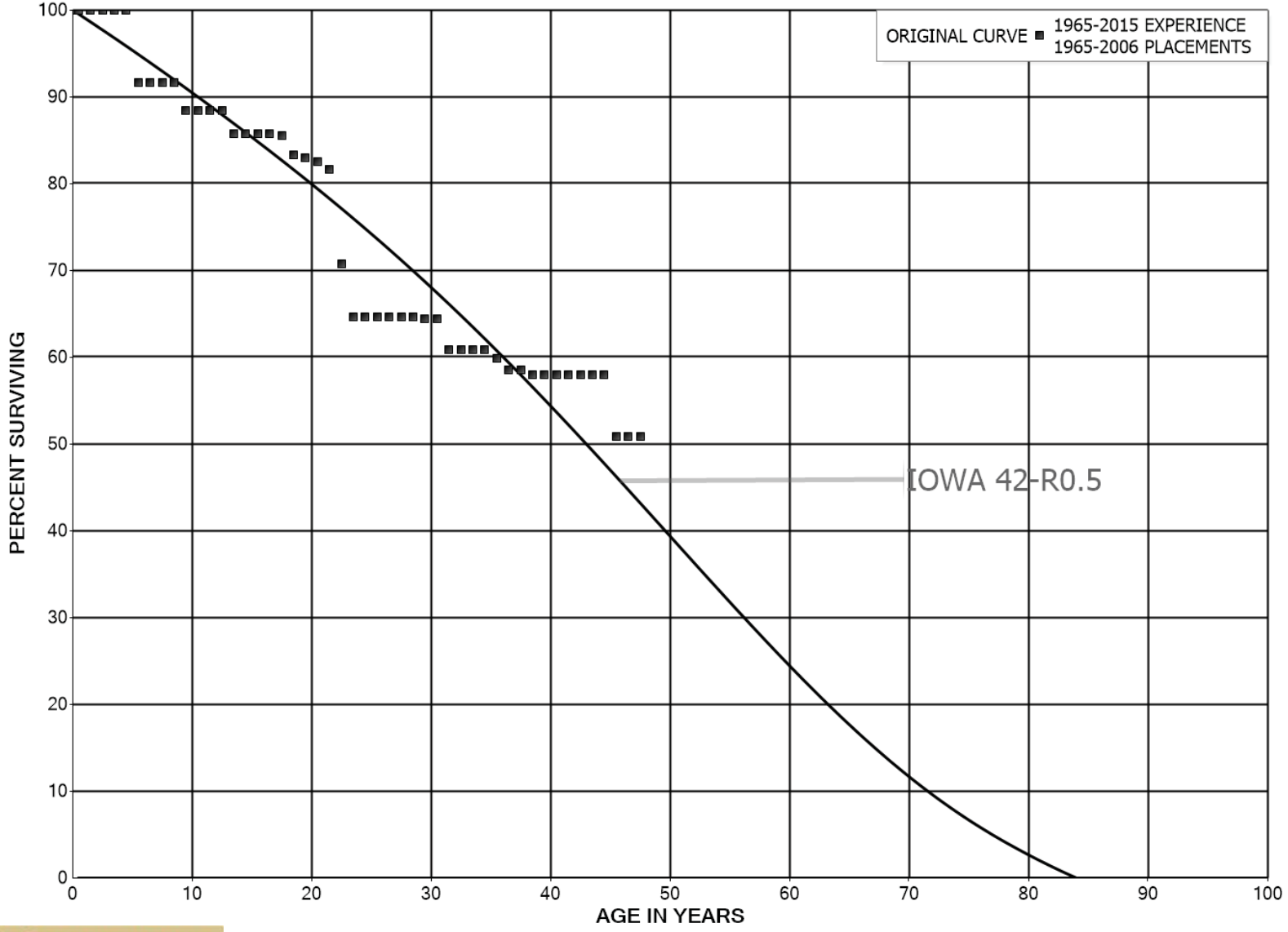
ACCOUNT L06 - LINE COUPLING EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-1989 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 283,845 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 283,845 | 3,500 | 0.0123 | 0.9877 | 100.00 |
| 15.5 | 280,345 | | 0.0000 | 1.0000 | 98.77 |
| 16.5 | 280,345 | | 0.0000 | 1.0000 | 98.77 |
| 17.5 | 280,345 | 2,288 | 0.0082 | 0.9918 | 98.77 |
| 18.5 | 278,057 | 25,956 | 0.0933 | 0.9067 | 97.96 |
| 19.5 | 252,101 | 9,613 | 0.0381 | 0.9619 | 88.82 |
| 20.5 | 242,488 | 8,841 | 0.0365 | 0.9635 | 85.43 |
| 21.5 | 233,647 | 33,900 | 0.1451 | 0.8549 | 82.32 |
| 22.5 | 199,747 | 34,202 | 0.1712 | 0.8288 | 70.37 |
| 23.5 | 165,546 | 31,132 | 0.1881 | 0.8119 | 58.32 |
| 24.5 | 134,414 | 58,470 | 0.4350 | 0.5650 | 47.35 |
| 25.5 | 75,945 | 9,291 | 0.1223 | 0.8777 | 26.76 |
| 26.5 | 66,654 | 26,127 | 0.3920 | 0.6080 | 23.48 |
| 27.5 | 40,527 | 21,273 | 0.5249 | 0.4751 | 14.28 |
| 28.5 | 19,254 | 6,528 | 0.3391 | 0.6609 | 6.78 |
| 29.5 | 12,726 | | 0.0000 | 1.0000 | 4.48 |
| 30.5 | 12,726 | | 0.0000 | 1.0000 | 4.48 |
| 31.5 | 1,500 | | 0.0000 | 1.0000 | 4.48 |
| 32.5 | 1,500 | | 0.0000 | 1.0000 | 4.48 |
| 33.5 | 1,500 | 1,500 | 1.0000 | | 4.48 |
| 34.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M01 - MAIN BREAKERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M01 - MAIN BREAKERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2006 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 736,754 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 736,754 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 736,754 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 736,754 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 736,754 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 736,754 | 62,132 | 0.0843 | 0.9157 | 100.00 |
| 5.5 | 674,622 | | 0.0000 | 1.0000 | 91.57 |
| 6.5 | 674,622 | | 0.0000 | 1.0000 | 91.57 |
| 7.5 | 674,622 | | 0.0000 | 1.0000 | 91.57 |
| 8.5 | 674,622 | 23,698 | 0.0351 | 0.9649 | 91.57 |
| 9.5 | 531,730 | | 0.0000 | 1.0000 | 88.35 |
| 10.5 | 531,730 | | 0.0000 | 1.0000 | 88.35 |
| 11.5 | 503,834 | | 0.0000 | 1.0000 | 88.35 |
| 12.5 | 411,286 | 12,000 | 0.0292 | 0.9708 | 88.35 |
| 13.5 | 399,286 | | 0.0000 | 1.0000 | 85.77 |
| 14.5 | 351,328 | | 0.0000 | 1.0000 | 85.77 |
| 15.5 | 351,328 | | 0.0000 | 1.0000 | 85.77 |
| 16.5 | 351,328 | 1,200 | 0.0034 | 0.9966 | 85.77 |
| 17.5 | 326,517 | 8,319 | 0.0255 | 0.9745 | 85.48 |
| 18.5 | 313,682 | 1,200 | 0.0038 | 0.9962 | 83.30 |
| 19.5 | 216,280 | 1,200 | 0.0055 | 0.9945 | 82.98 |
| 20.5 | 215,080 | 2,400 | 0.0112 | 0.9888 | 82.52 |
| 21.5 | 212,680 | 28,313 | 0.1331 | 0.8669 | 81.60 |
| 22.5 | 184,367 | 15,852 | 0.0860 | 0.9140 | 70.74 |
| 23.5 | 168,515 | | 0.0000 | 1.0000 | 64.66 |
| 24.5 | 163,837 | | 0.0000 | 1.0000 | 64.66 |
| 25.5 | 163,837 | | 0.0000 | 1.0000 | 64.66 |
| 26.5 | 163,837 | | 0.0000 | 1.0000 | 64.66 |
| 27.5 | 163,837 | | 0.0000 | 1.0000 | 64.66 |
| 28.5 | 163,837 | 798 | 0.0049 | 0.9951 | 64.66 |
| 29.5 | 148,265 | | 0.0000 | 1.0000 | 64.34 |
| 30.5 | 148,265 | 8,161 | 0.0550 | 0.9450 | 64.34 |
| 31.5 | 140,104 | | 0.0000 | 1.0000 | 60.80 |
| 32.5 | 126,104 | | 0.0000 | 1.0000 | 60.80 |
| 33.5 | 126,104 | | 0.0000 | 1.0000 | 60.80 |
| 34.5 | 126,104 | 1,941 | 0.0154 | 0.9846 | 60.80 |
| 35.5 | 109,962 | 2,400 | 0.0218 | 0.9782 | 59.86 |
| 36.5 | 107,562 | | 0.0000 | 1.0000 | 58.56 |
| 37.5 | 107,562 | 1,200 | 0.0112 | 0.9888 | 58.56 |
| 38.5 | 106,362 | | 0.0000 | 1.0000 | 57.90 |

NEWFOUNDLAND AND LABRADOR HYDRO

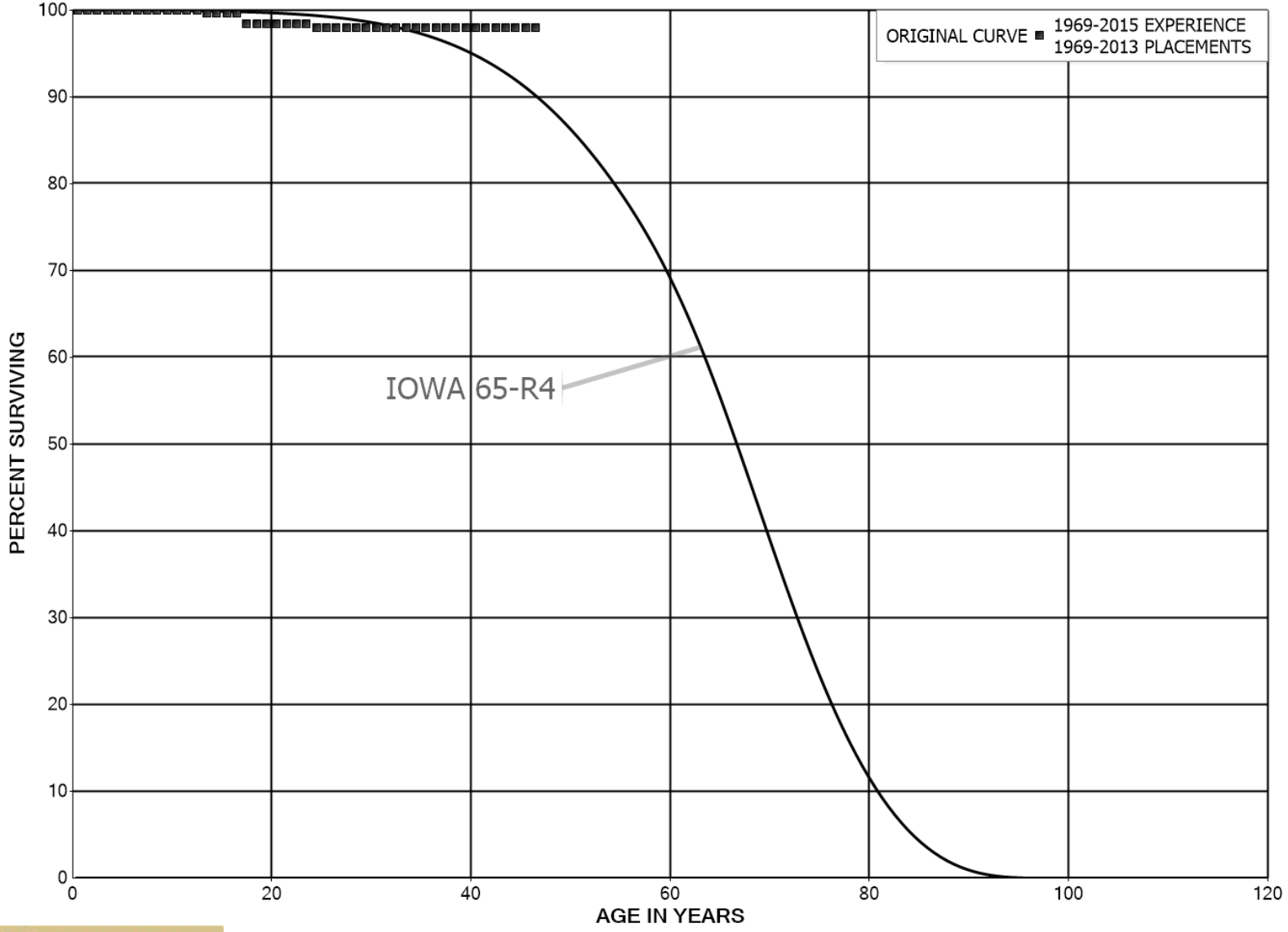
ACCOUNT M01 - MAIN BREAKERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2006 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 106,362 | | 0.0000 | 1.0000 | 57.90 |
| 40.5 | 106,362 | | 0.0000 | 1.0000 | 57.90 |
| 41.5 | 106,362 | | 0.0000 | 1.0000 | 57.90 |
| 42.5 | 106,362 | | 0.0000 | 1.0000 | 57.90 |
| 43.5 | 106,362 | | 0.0000 | 1.0000 | 57.90 |
| 44.5 | 106,362 | 13,000 | 0.1222 | 0.8778 | 57.90 |
| 45.5 | 87,097 | | 0.0000 | 1.0000 | 50.83 |
| 46.5 | 87,097 | | 0.0000 | 1.0000 | 50.83 |
| 47.5 | | | | | 50.83 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M02 - MARINE TERMINAL
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M02 - MARINE TERMINAL

ORIGINAL LIFE TABLE

PLACEMENT BAND 1969-2013 EXPERIENCE BAND 1969-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 4,370,678 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 4,370,678 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 4,370,678 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 3,513,142 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 3,513,142 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 3,513,142 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 3,513,142 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 3,391,551 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 3,391,551 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 3,391,551 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 3,391,551 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 3,391,551 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 3,391,551 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 3,391,551 | 12,192 | 0.0036 | 0.9964 | 100.00 |
| 13.5 | 3,379,359 | | 0.0000 | 1.0000 | 99.64 |
| 14.5 | 3,379,359 | | 0.0000 | 1.0000 | 99.64 |
| 15.5 | 3,379,359 | 1,114 | 0.0003 | 0.9997 | 99.64 |
| 16.5 | 3,378,245 | 39,909 | 0.0118 | 0.9882 | 99.61 |
| 17.5 | 3,338,336 | | 0.0000 | 1.0000 | 98.43 |
| 18.5 | 3,338,336 | | 0.0000 | 1.0000 | 98.43 |
| 19.5 | 2,991,404 | | 0.0000 | 1.0000 | 98.43 |
| 20.5 | 2,991,404 | | 0.0000 | 1.0000 | 98.43 |
| 21.5 | 2,991,404 | | 0.0000 | 1.0000 | 98.43 |
| 22.5 | 2,991,404 | | 0.0000 | 1.0000 | 98.43 |
| 23.5 | 2,991,404 | 15,069 | 0.0050 | 0.9950 | 98.43 |
| 24.5 | 2,976,335 | | 0.0000 | 1.0000 | 97.94 |
| 25.5 | 2,976,335 | | 0.0000 | 1.0000 | 97.94 |
| 26.5 | 2,976,335 | | 0.0000 | 1.0000 | 97.94 |
| 27.5 | 2,976,335 | | 0.0000 | 1.0000 | 97.94 |
| 28.5 | 2,976,335 | | 0.0000 | 1.0000 | 97.94 |
| 29.5 | 2,976,335 | | 0.0000 | 1.0000 | 97.94 |
| 30.5 | 2,976,335 | | 0.0000 | 1.0000 | 97.94 |
| 31.5 | 2,689,521 | | 0.0000 | 1.0000 | 97.94 |
| 32.5 | 2,678,149 | | 0.0000 | 1.0000 | 97.94 |
| 33.5 | 2,678,149 | | 0.0000 | 1.0000 | 97.94 |
| 34.5 | 2,678,149 | | 0.0000 | 1.0000 | 97.94 |
| 35.5 | 2,665,300 | | 0.0000 | 1.0000 | 97.94 |
| 36.5 | 2,665,300 | | 0.0000 | 1.0000 | 97.94 |
| 37.5 | 2,665,300 | | 0.0000 | 1.0000 | 97.94 |
| 38.5 | 2,665,300 | | 0.0000 | 1.0000 | 97.94 |

NEWFOUNDLAND AND LABRADOR HYDRO

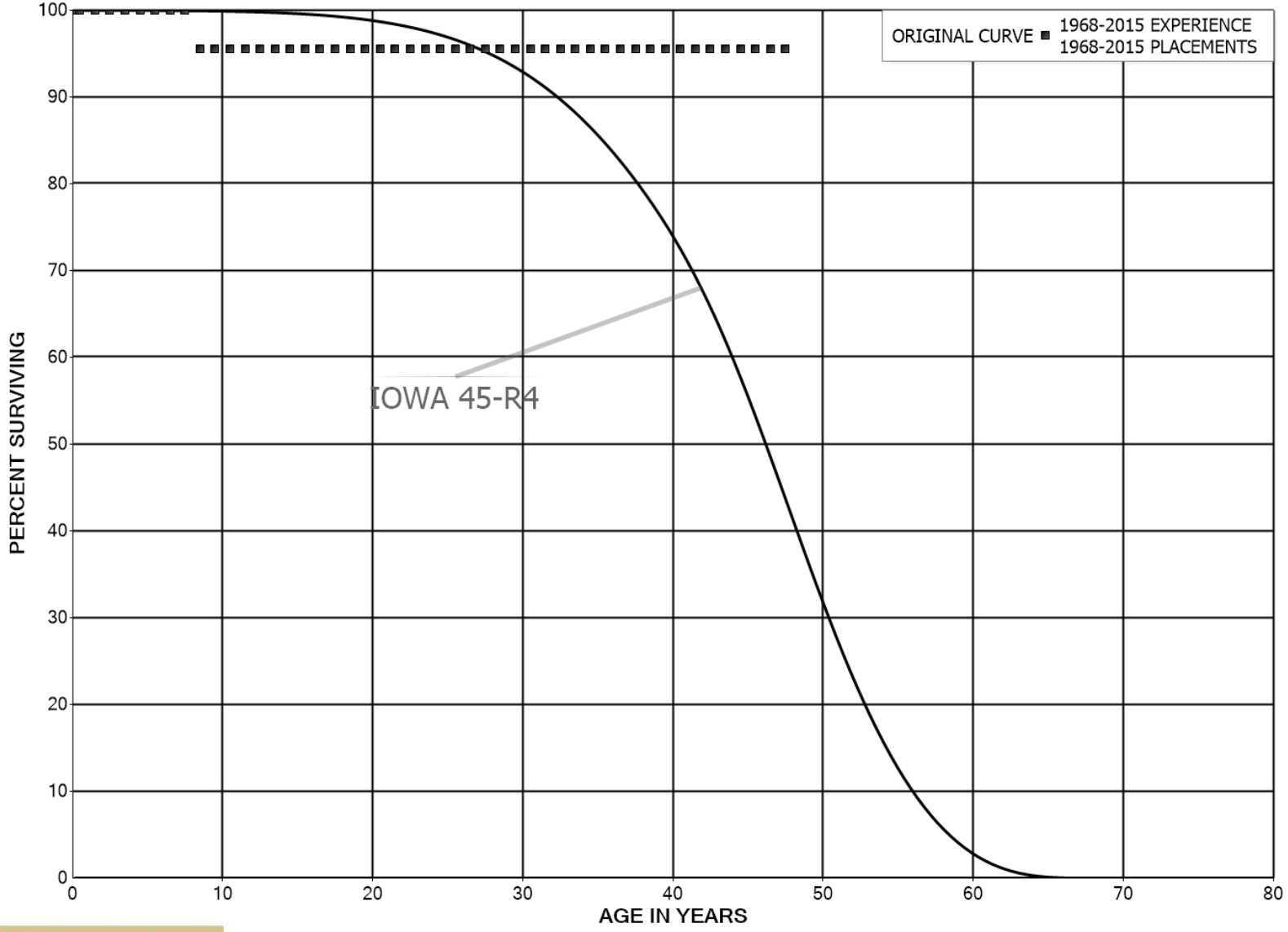
ACCOUNT M02 - MARINE TERMINAL

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1969-2013 EXPERIENCE BAND 1969-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 2,665,300 | | 0.0000 | 1.0000 | 97.94 |
| 40.5 | 2,665,300 | | 0.0000 | 1.0000 | 97.94 |
| 41.5 | 2,665,300 | | 0.0000 | 1.0000 | 97.94 |
| 42.5 | 2,665,300 | | 0.0000 | 1.0000 | 97.94 |
| 43.5 | 2,665,300 | | 0.0000 | 1.0000 | 97.94 |
| 44.5 | 2,596,300 | | 0.0000 | 1.0000 | 97.94 |
| 45.5 | 2,596,300 | | 0.0000 | 1.0000 | 97.94 |
| 46.5 | | | | | 97.94 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M03 - METALCLAD SWITCHGEAR CUB/EQU 4kv/600
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M03 - METALCLAD SWITCHGEAR CUB/EQU 4kv/600

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 2,321,761 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 1,937,987 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 1,937,987 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 1,937,987 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,937,987 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 1,937,987 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 1,937,987 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 1,937,987 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 1,937,987 | 88,117 | 0.0455 | 0.9545 | 100.00 |
| 8.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 9.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 10.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 11.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 12.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 13.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 14.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 15.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 16.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 17.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 18.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 19.5 | 1,849,870 | | 0.0000 | 1.0000 | 95.45 |
| 20.5 | 1,835,582 | | 0.0000 | 1.0000 | 95.45 |
| 21.5 | 1,268,370 | | 0.0000 | 1.0000 | 95.45 |
| 22.5 | 1,268,370 | | 0.0000 | 1.0000 | 95.45 |
| 23.5 | 1,268,370 | | 0.0000 | 1.0000 | 95.45 |
| 24.5 | 1,268,370 | | 0.0000 | 1.0000 | 95.45 |
| 25.5 | 1,268,370 | | 0.0000 | 1.0000 | 95.45 |
| 26.5 | 1,268,370 | | 0.0000 | 1.0000 | 95.45 |
| 27.5 | 1,268,370 | | 0.0000 | 1.0000 | 95.45 |
| 28.5 | 1,211,961 | | 0.0000 | 1.0000 | 95.45 |
| 29.5 | 1,211,961 | | 0.0000 | 1.0000 | 95.45 |
| 30.5 | 1,211,961 | | 0.0000 | 1.0000 | 95.45 |
| 31.5 | 1,211,961 | | 0.0000 | 1.0000 | 95.45 |
| 32.5 | 1,211,961 | | 0.0000 | 1.0000 | 95.45 |
| 33.5 | 1,211,961 | | 0.0000 | 1.0000 | 95.45 |
| 34.5 | 1,211,961 | | 0.0000 | 1.0000 | 95.45 |
| 35.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 36.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 37.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 38.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |

NEWFOUNDLAND AND LABRADOR HYDRO

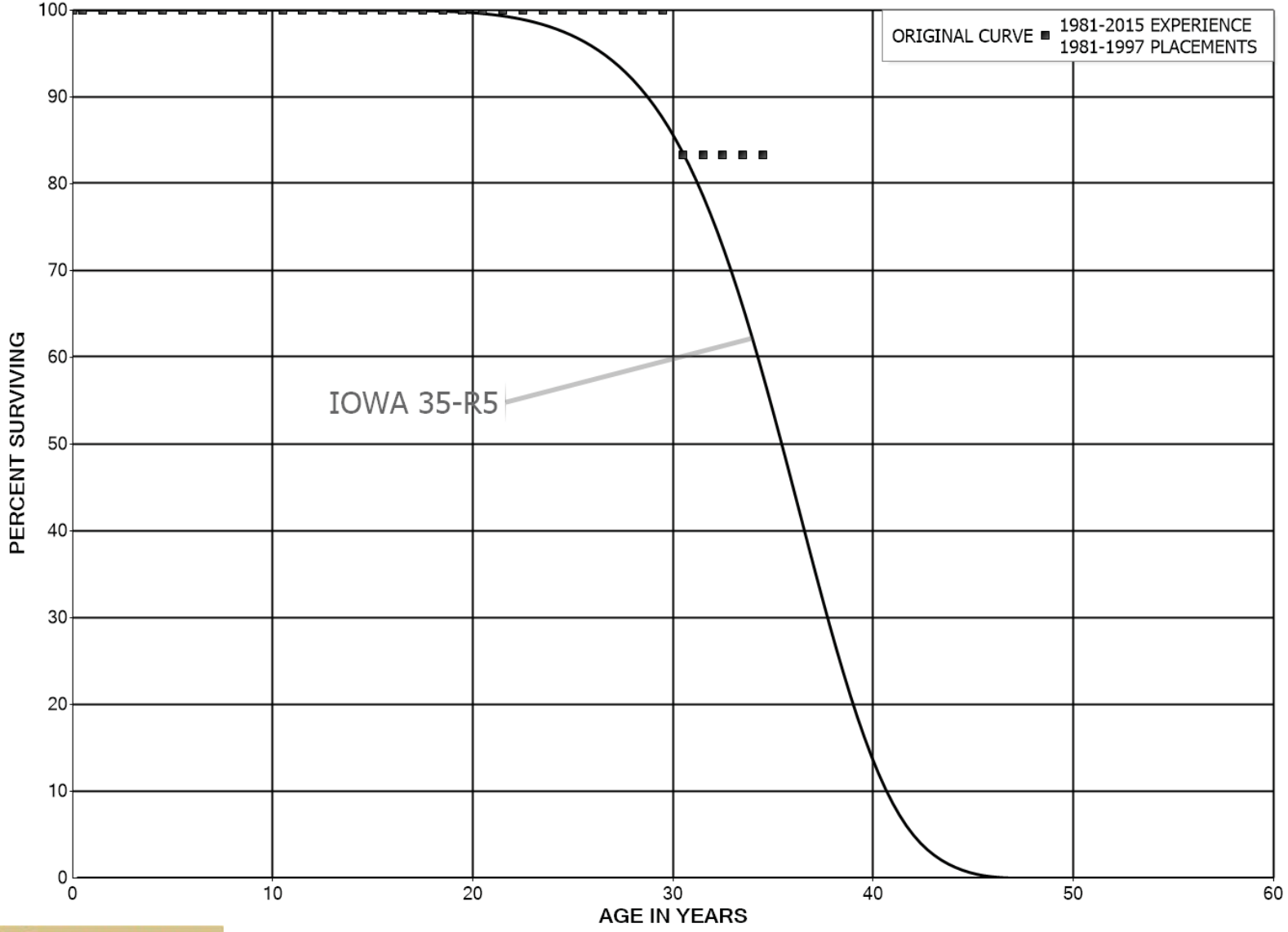
ACCOUNT M03 - METALCLAD SWITCHGEAR CUB/EQU 4kv/600

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 40.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 41.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 42.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 43.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 44.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 45.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 46.5 | 431,573 | | 0.0000 | 1.0000 | 95.45 |
| 47.5 | | | | | 95.45 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M04 - METER TEST SWITCHES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

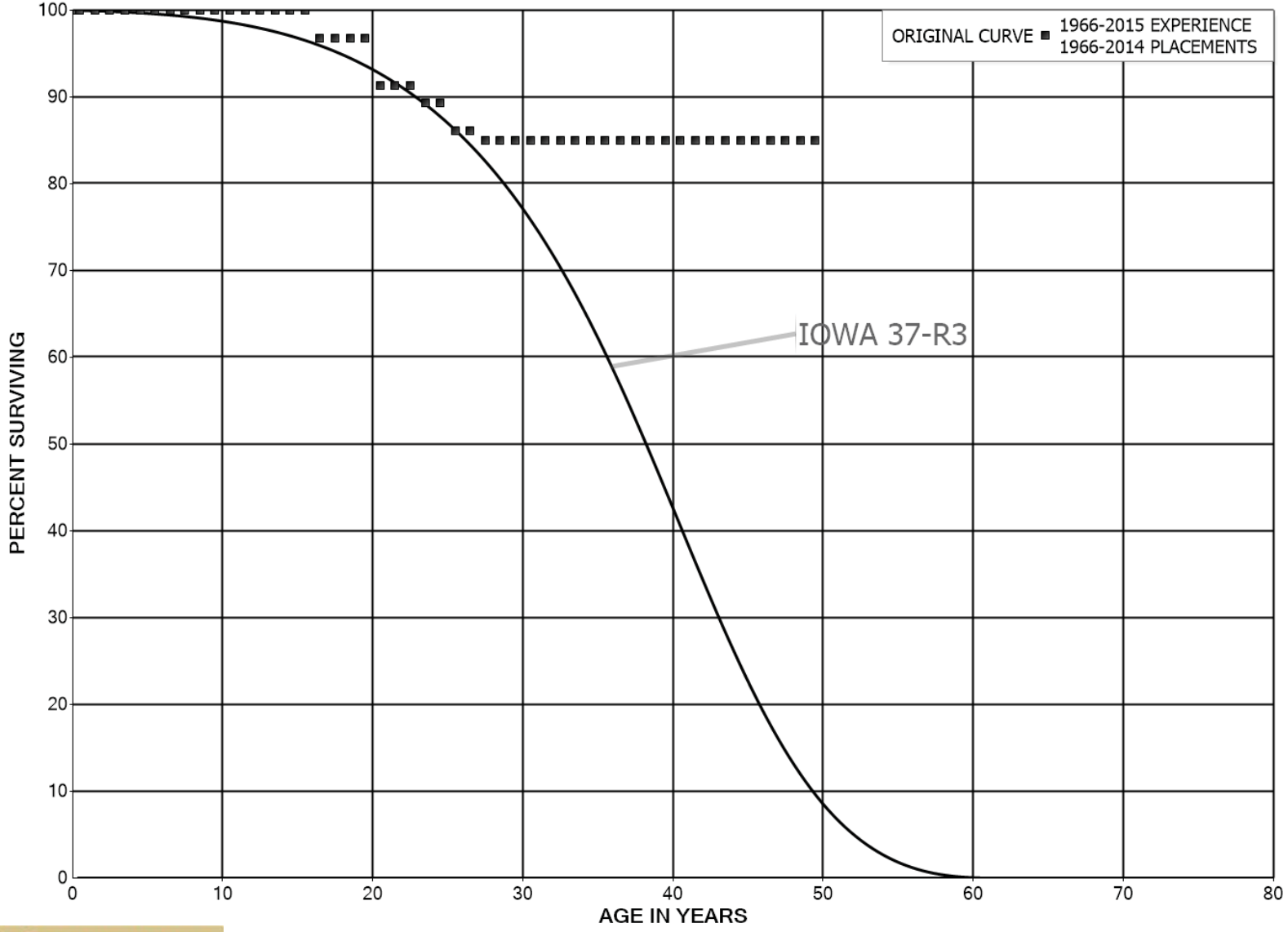
ACCOUNT M04 - METER TEST SWITCHES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1981-1997 EXPERIENCE BAND 1981-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 60,735 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 55,044 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 55,044 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 55,044 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 43,701 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 42,485 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 42,485 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 29,763 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 29,763 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 29,763 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 26,459 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 14,602 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 14,602 | 2,434 | 0.1667 | 0.8333 | 100.00 |
| 30.5 | 12,168 | | 0.0000 | 1.0000 | 83.33 |
| 31.5 | 11,271 | | 0.0000 | 1.0000 | 83.33 |
| 32.5 | 11,271 | | 0.0000 | 1.0000 | 83.33 |
| 33.5 | 9,278 | | 0.0000 | 1.0000 | 83.33 |
| 34.5 | | | | | 83.33 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M05 - METERING TANKS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M05 - METERING TANKS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2014 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 705,132 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 705,132 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 565,098 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 469,655 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 409,740 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 343,171 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 343,171 | 11,420 | 0.0333 | 0.9667 | 100.00 |
| 16.5 | 331,751 | | 0.0000 | 1.0000 | 96.67 |
| 17.5 | 331,751 | | 0.0000 | 1.0000 | 96.67 |
| 18.5 | 330,505 | | 0.0000 | 1.0000 | 96.67 |
| 19.5 | 316,174 | 17,609 | 0.0557 | 0.9443 | 96.67 |
| 20.5 | 298,565 | | 0.0000 | 1.0000 | 91.29 |
| 21.5 | 277,148 | | 0.0000 | 1.0000 | 91.29 |
| 22.5 | 241,006 | 5,184 | 0.0215 | 0.9785 | 91.29 |
| 23.5 | 218,320 | | 0.0000 | 1.0000 | 89.32 |
| 24.5 | 218,320 | 8,002 | 0.0367 | 0.9633 | 89.32 |
| 25.5 | 210,318 | | 0.0000 | 1.0000 | 86.05 |
| 26.5 | 198,433 | 2,500 | 0.0126 | 0.9874 | 86.05 |
| 27.5 | 182,108 | | 0.0000 | 1.0000 | 84.97 |
| 28.5 | 182,108 | | 0.0000 | 1.0000 | 84.97 |
| 29.5 | 182,108 | | 0.0000 | 1.0000 | 84.97 |
| 30.5 | 182,108 | | 0.0000 | 1.0000 | 84.97 |
| 31.5 | 170,992 | | 0.0000 | 1.0000 | 84.97 |
| 32.5 | 165,644 | | 0.0000 | 1.0000 | 84.97 |
| 33.5 | 165,644 | | 0.0000 | 1.0000 | 84.97 |
| 34.5 | 34,552 | | 0.0000 | 1.0000 | 84.97 |
| 35.5 | 34,552 | | 0.0000 | 1.0000 | 84.97 |
| 36.5 | 26,391 | | 0.0000 | 1.0000 | 84.97 |
| 37.5 | 20,957 | | 0.0000 | 1.0000 | 84.97 |
| 38.5 | 20,957 | | 0.0000 | 1.0000 | 84.97 |

NEWFOUNDLAND AND LABRADOR HYDRO

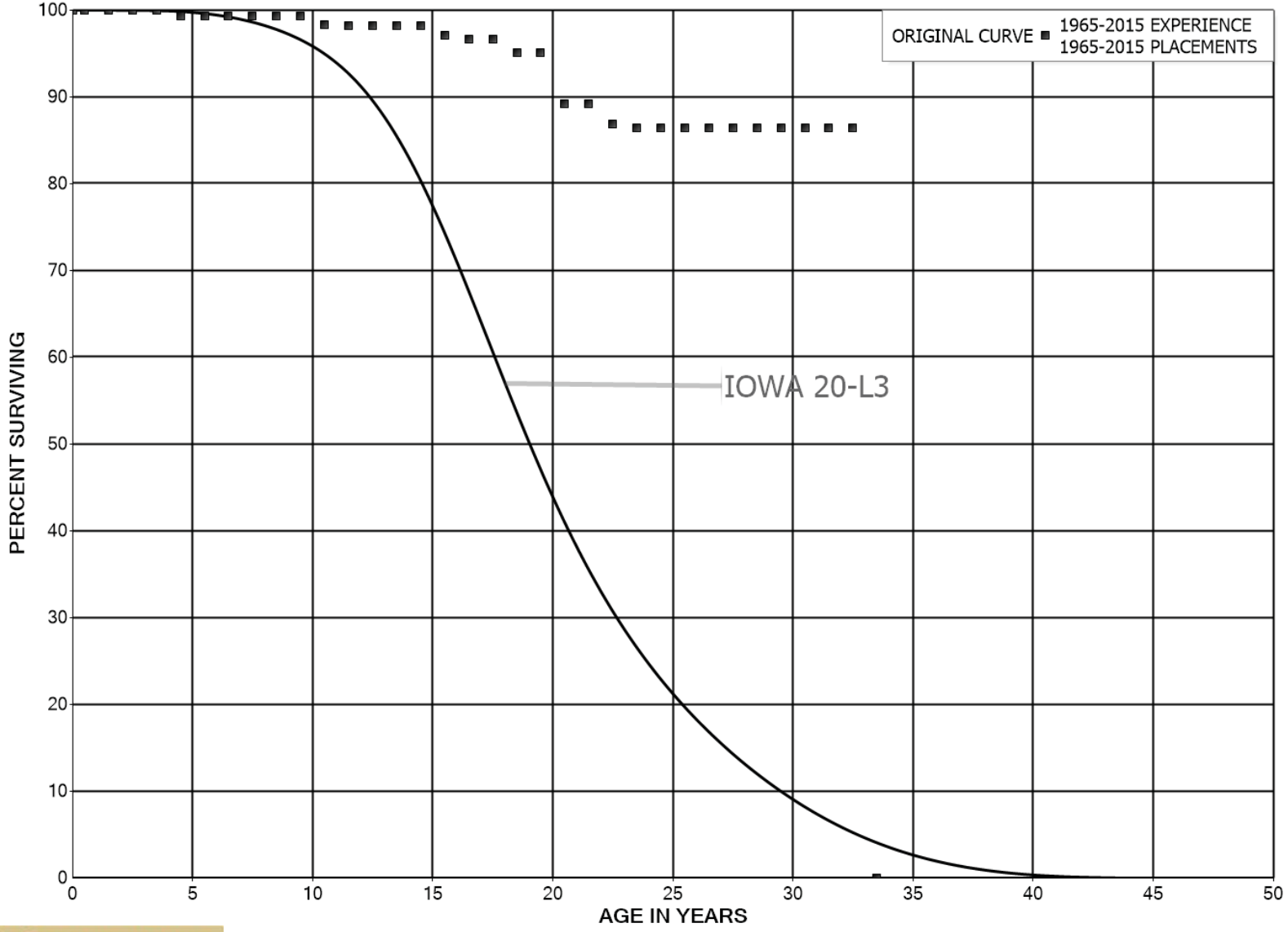
ACCOUNT M05 - METERING TANKS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2014 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 20,957 | | 0.0000 | 1.0000 | 84.97 |
| 40.5 | 20,957 | | 0.0000 | 1.0000 | 84.97 |
| 41.5 | 20,957 | | 0.0000 | 1.0000 | 84.97 |
| 42.5 | 20,957 | | 0.0000 | 1.0000 | 84.97 |
| 43.5 | 13,595 | | 0.0000 | 1.0000 | 84.97 |
| 44.5 | 13,595 | | 0.0000 | 1.0000 | 84.97 |
| 45.5 | 9,614 | | 0.0000 | 1.0000 | 84.97 |
| 46.5 | 9,614 | | 0.0000 | 1.0000 | 84.97 |
| 47.5 | 2,500 | | 0.0000 | 1.0000 | 84.97 |
| 48.5 | 2,500 | | 0.0000 | 1.0000 | 84.97 |
| 49.5 | | | | | 84.97 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M06 - METERS - DIGITAL
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

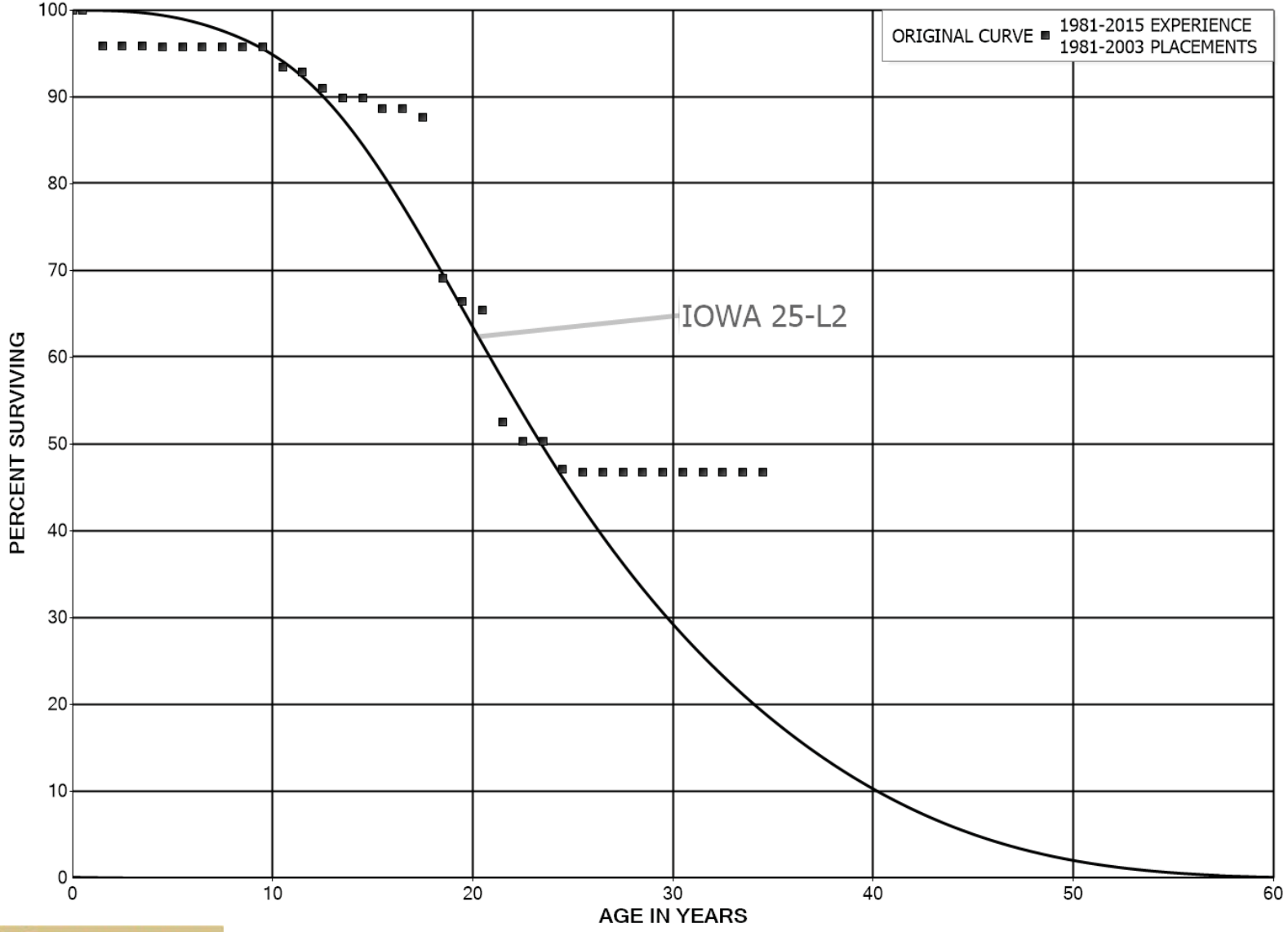
ACCOUNT M06 - METERS - DIGITAL

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 6,037,293 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 5,625,739 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 5,536,167 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 4,824,333 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 4,303,225 | 30,980 | 0.0072 | 0.9928 | 100.00 |
| 4.5 | 3,964,086 | | 0.0000 | 1.0000 | 99.28 |
| 5.5 | 3,569,971 | | 0.0000 | 1.0000 | 99.28 |
| 6.5 | 2,133,272 | | 0.0000 | 1.0000 | 99.28 |
| 7.5 | 2,060,513 | | 0.0000 | 1.0000 | 99.28 |
| 8.5 | 1,972,191 | | 0.0000 | 1.0000 | 99.28 |
| 9.5 | 1,913,144 | 19,570 | 0.0102 | 0.9898 | 99.28 |
| 10.5 | 1,793,295 | 1,202 | 0.0007 | 0.9993 | 98.26 |
| 11.5 | 1,589,911 | | 0.0000 | 1.0000 | 98.20 |
| 12.5 | 1,525,115 | | 0.0000 | 1.0000 | 98.20 |
| 13.5 | 1,331,321 | | 0.0000 | 1.0000 | 98.20 |
| 14.5 | 1,181,881 | 13,761 | 0.0116 | 0.9884 | 98.20 |
| 15.5 | 1,145,185 | 5,442 | 0.0048 | 0.9952 | 97.06 |
| 16.5 | 1,050,035 | | 0.0000 | 1.0000 | 96.59 |
| 17.5 | 900,361 | 14,155 | 0.0157 | 0.9843 | 96.59 |
| 18.5 | 770,061 | | 0.0000 | 1.0000 | 95.08 |
| 19.5 | 718,143 | 44,781 | 0.0624 | 0.9376 | 95.08 |
| 20.5 | 654,314 | | 0.0000 | 1.0000 | 89.15 |
| 21.5 | 567,605 | 14,687 | 0.0259 | 0.9741 | 89.15 |
| 22.5 | 549,560 | 2,907 | 0.0053 | 0.9947 | 86.84 |
| 23.5 | 412,318 | | 0.0000 | 1.0000 | 86.38 |
| 24.5 | 37,966 | | 0.0000 | 1.0000 | 86.38 |
| 25.5 | 15,141 | | 0.0000 | 1.0000 | 86.38 |
| 26.5 | 15,141 | | 0.0000 | 1.0000 | 86.38 |
| 27.5 | 15,141 | | 0.0000 | 1.0000 | 86.38 |
| 28.5 | 15,141 | | 0.0000 | 1.0000 | 86.38 |
| 29.5 | 15,141 | | 0.0000 | 1.0000 | 86.38 |
| 30.5 | 15,141 | | 0.0000 | 1.0000 | 86.38 |
| 31.5 | 15,141 | | 0.0000 | 1.0000 | 86.38 |
| 32.5 | 15,141 | 15,141 | 1.0000 | | 86.38 |
| 33.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M07 - METERS - ANALOGUE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

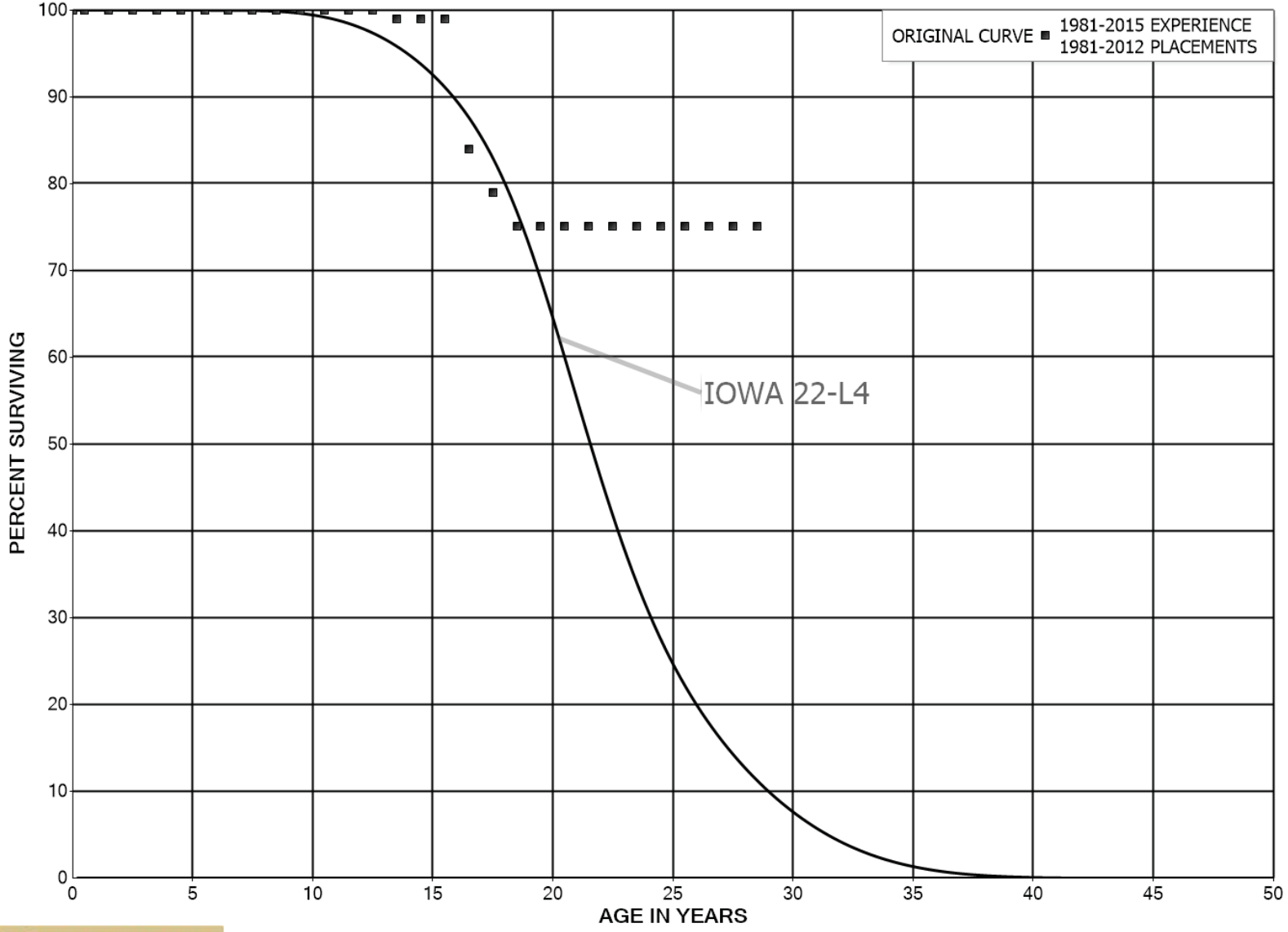
ACCOUNT M07 - METERS - ANALOGUE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1981-2003 EXPERIENCE BAND 1981-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 1,493,442 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 1,493,442 | 62,730 | 0.0420 | 0.9580 | 100.00 |
| 1.5 | 1,430,712 | | 0.0000 | 1.0000 | 95.80 |
| 2.5 | 1,430,712 | | 0.0000 | 1.0000 | 95.80 |
| 3.5 | 1,430,712 | 399 | 0.0003 | 0.9997 | 95.80 |
| 4.5 | 1,430,314 | | 0.0000 | 1.0000 | 95.77 |
| 5.5 | 1,430,314 | | 0.0000 | 1.0000 | 95.77 |
| 6.5 | 1,430,314 | 344 | 0.0002 | 0.9998 | 95.77 |
| 7.5 | 1,429,970 | 290 | 0.0002 | 0.9998 | 95.75 |
| 8.5 | 1,429,679 | | 0.0000 | 1.0000 | 95.73 |
| 9.5 | 1,429,679 | 35,356 | 0.0247 | 0.9753 | 95.73 |
| 10.5 | 1,394,323 | 8,069 | 0.0058 | 0.9942 | 93.36 |
| 11.5 | 1,386,254 | 28,092 | 0.0203 | 0.9797 | 92.82 |
| 12.5 | 1,358,162 | 15,803 | 0.0116 | 0.9884 | 90.94 |
| 13.5 | 1,342,359 | | 0.0000 | 1.0000 | 89.88 |
| 14.5 | 1,342,359 | 19,057 | 0.0142 | 0.9858 | 89.88 |
| 15.5 | 1,323,302 | 204 | 0.0002 | 0.9998 | 88.61 |
| 16.5 | 1,323,098 | 13,890 | 0.0105 | 0.9895 | 88.59 |
| 17.5 | 1,309,208 | 277,503 | 0.2120 | 0.7880 | 87.66 |
| 18.5 | 1,031,705 | 39,340 | 0.0381 | 0.9619 | 69.08 |
| 19.5 | 992,365 | 15,494 | 0.0156 | 0.9844 | 66.45 |
| 20.5 | 976,871 | 193,449 | 0.1980 | 0.8020 | 65.41 |
| 21.5 | 783,422 | 32,848 | 0.0419 | 0.9581 | 52.46 |
| 22.5 | 750,574 | | 0.0000 | 1.0000 | 50.26 |
| 23.5 | 750,574 | 46,989 | 0.0626 | 0.9374 | 50.26 |
| 24.5 | 703,585 | 5,201 | 0.0074 | 0.9926 | 47.11 |
| 25.5 | 698,384 | | 0.0000 | 1.0000 | 46.76 |
| 26.5 | 549,645 | | 0.0000 | 1.0000 | 46.76 |
| 27.5 | 352,574 | | 0.0000 | 1.0000 | 46.76 |
| 28.5 | 206,618 | | 0.0000 | 1.0000 | 46.76 |
| 29.5 | 206,618 | | 0.0000 | 1.0000 | 46.76 |
| 30.5 | 206,618 | | 0.0000 | 1.0000 | 46.76 |
| 31.5 | 150,111 | | 0.0000 | 1.0000 | 46.76 |
| 32.5 | 138,968 | | 0.0000 | 1.0000 | 46.76 |
| 33.5 | 138,968 | | 0.0000 | 1.0000 | 46.76 |
| 34.5 | | | | | 46.76 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M08 - METERS - OTHER
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

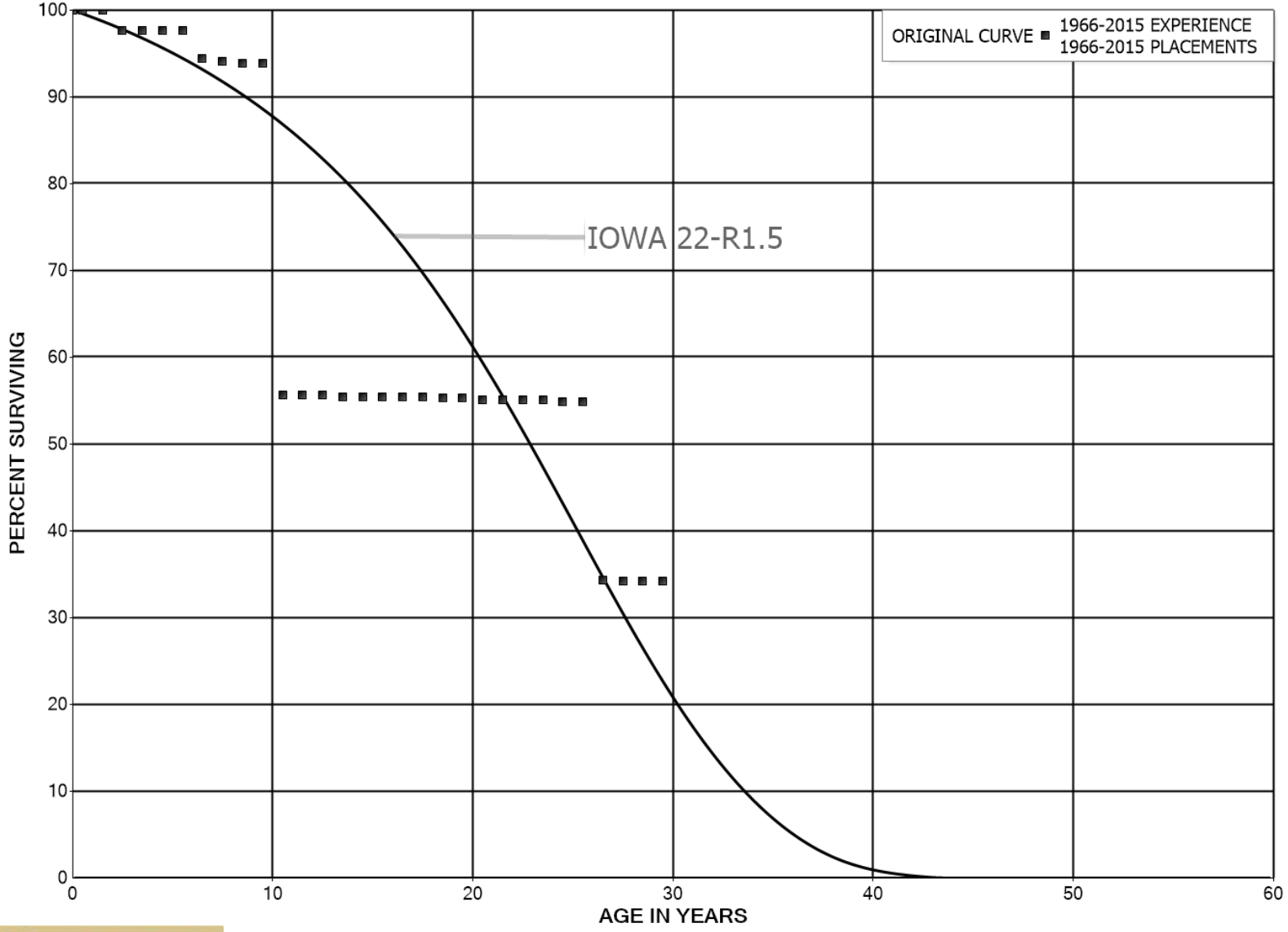
ACCOUNT M08 - METERS - OTHER

ORIGINAL LIFE TABLE

PLACEMENT BAND 1981-2012 EXPERIENCE BAND 1981-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 300,408 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 300,408 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 300,408 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 300,408 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 221,165 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 221,165 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 221,165 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 221,165 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 221,165 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 221,165 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 199,415 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 171,757 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 168,002 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 152,181 | 1,588 | 0.0104 | 0.9896 | 100.00 |
| 13.5 | 150,594 | | 0.0000 | 1.0000 | 98.96 |
| 14.5 | 150,594 | | 0.0000 | 1.0000 | 98.96 |
| 15.5 | 148,829 | 22,487 | 0.1511 | 0.8489 | 98.96 |
| 16.5 | 126,342 | 7,513 | 0.0595 | 0.9405 | 84.01 |
| 17.5 | 117,996 | 5,967 | 0.0506 | 0.9494 | 79.01 |
| 18.5 | 72,459 | | 0.0000 | 1.0000 | 75.01 |
| 19.5 | 56,346 | | 0.0000 | 1.0000 | 75.01 |
| 20.5 | 34,155 | | 0.0000 | 1.0000 | 75.01 |
| 21.5 | 21,023 | | 0.0000 | 1.0000 | 75.01 |
| 22.5 | 12,210 | | 0.0000 | 1.0000 | 75.01 |
| 23.5 | 12,210 | | 0.0000 | 1.0000 | 75.01 |
| 24.5 | 12,210 | | 0.0000 | 1.0000 | 75.01 |
| 25.5 | 12,210 | | 0.0000 | 1.0000 | 75.01 |
| 26.5 | 12,210 | | 0.0000 | 1.0000 | 75.01 |
| 27.5 | 450 | | 0.0000 | 1.0000 | 75.01 |
| 28.5 | | | | | 75.01 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M10 - MISCELLANEOUS UNITS OF PROPERTY
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M10 - MISCELLANEOUS UNITS OF PROPERTY

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 30,935,849 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 30,615,702 | 21,599 | 0.0007 | 0.9993 | 100.00 |
| 1.5 | 29,046,158 | 663,327 | 0.0228 | 0.9772 | 99.93 |
| 2.5 | 26,800,997 | | 0.0000 | 1.0000 | 97.65 |
| 3.5 | 26,800,997 | | 0.0000 | 1.0000 | 97.65 |
| 4.5 | 25,286,937 | 1,987 | 0.0001 | 0.9999 | 97.65 |
| 5.5 | 4,846,873 | 163,508 | 0.0337 | 0.9663 | 97.64 |
| 6.5 | 4,683,364 | 14,534 | 0.0031 | 0.9969 | 94.35 |
| 7.5 | 4,668,830 | 10,016 | 0.0021 | 0.9979 | 94.05 |
| 8.5 | 4,641,691 | | 0.0000 | 1.0000 | 93.85 |
| 9.5 | 4,641,691 | 1,889,486 | 0.4071 | 0.5929 | 93.85 |
| 10.5 | 2,752,205 | | 0.0000 | 1.0000 | 55.65 |
| 11.5 | 2,736,621 | | 0.0000 | 1.0000 | 55.65 |
| 12.5 | 2,736,621 | 9,946 | 0.0036 | 0.9964 | 55.65 |
| 13.5 | 2,726,675 | | 0.0000 | 1.0000 | 55.45 |
| 14.5 | 2,726,675 | | 0.0000 | 1.0000 | 55.45 |
| 15.5 | 2,726,675 | | 0.0000 | 1.0000 | 55.45 |
| 16.5 | 2,726,675 | 1,631 | 0.0006 | 0.9994 | 55.45 |
| 17.5 | 2,725,043 | 4,926 | 0.0018 | 0.9982 | 55.41 |
| 18.5 | 2,720,118 | 2,024 | 0.0007 | 0.9993 | 55.31 |
| 19.5 | 2,718,093 | 8,444 | 0.0031 | 0.9969 | 55.27 |
| 20.5 | 2,709,649 | | 0.0000 | 1.0000 | 55.10 |
| 21.5 | 2,709,649 | 920 | 0.0003 | 0.9997 | 55.10 |
| 22.5 | 2,708,729 | | 0.0000 | 1.0000 | 55.08 |
| 23.5 | 2,708,729 | 12,800 | 0.0047 | 0.9953 | 55.08 |
| 24.5 | 2,645,492 | | 0.0000 | 1.0000 | 54.82 |
| 25.5 | 1,819,518 | 682,013 | 0.3748 | 0.6252 | 54.82 |
| 26.5 | 342,222 | 600 | 0.0018 | 0.9982 | 34.27 |
| 27.5 | 341,622 | | 0.0000 | 1.0000 | 34.21 |
| 28.5 | 341,622 | | 0.0000 | 1.0000 | 34.21 |
| 29.5 | 341,622 | | 0.0000 | 1.0000 | 34.21 |
| 30.5 | 26,368 | 3,006 | 0.1140 | 0.8860 | 34.21 |
| 31.5 | 23,361 | | 0.0000 | 1.0000 | 30.31 |
| 32.5 | 23,361 | | 0.0000 | 1.0000 | 30.31 |
| 33.5 | 23,361 | | 0.0000 | 1.0000 | 30.31 |
| 34.5 | 23,361 | | 0.0000 | 1.0000 | 30.31 |
| 35.5 | 23,361 | 17,176 | 0.7352 | 0.2648 | 30.31 |
| 36.5 | 6,185 | | 0.0000 | 1.0000 | 8.02 |
| 37.5 | 6,185 | | 0.0000 | 1.0000 | 8.02 |
| 38.5 | 6,185 | | 0.0000 | 1.0000 | 8.02 |

NEWFOUNDLAND AND LABRADOR HYDRO

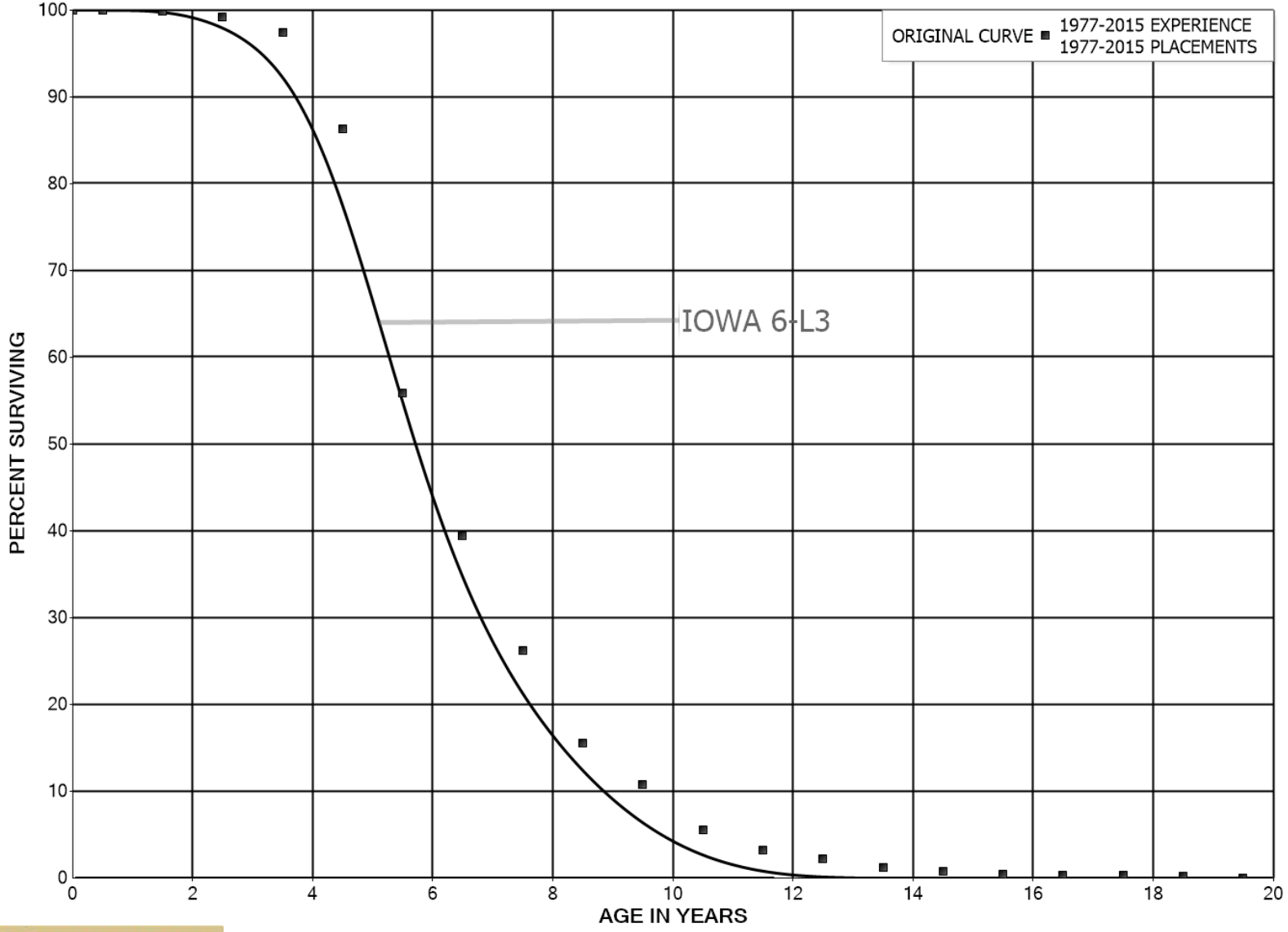
ACCOUNT M10 - MISCELLANEOUS UNITS OF PROPERTY

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 6,185 | | 0.0000 | 1.0000 | 8.02 |
| 40.5 | 6,185 | | 0.0000 | 1.0000 | 8.02 |
| 41.5 | 6,185 | | 0.0000 | 1.0000 | 8.02 |
| 42.5 | 6,185 | | 0.0000 | 1.0000 | 8.02 |
| 43.5 | 6,185 | | 0.0000 | 1.0000 | 8.02 |
| 44.5 | 6,185 | | 0.0000 | 1.0000 | 8.02 |
| 45.5 | | | | | 8.02 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M11 - MOBILE - A.T.V.'S AND SNOWMOBILES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

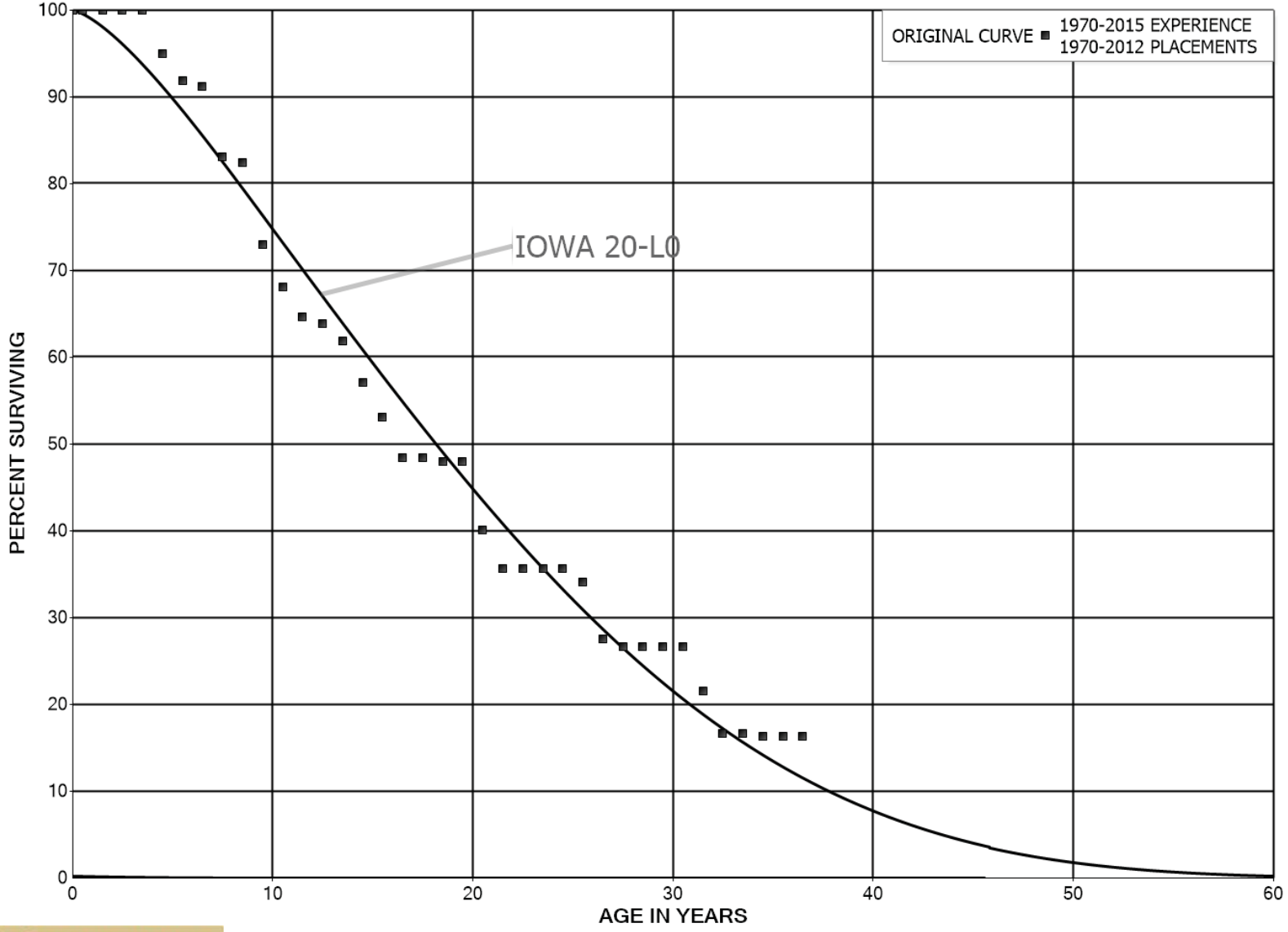
ACCOUNT M11 - MOBILE - A.T.V.'S AND SNOWMOBILES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1977-2015 EXPERIENCE BAND 1977-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 6,061,677 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 5,845,920 | 9,689 | 0.0017 | 0.9983 | 100.00 |
| 1.5 | 5,557,216 | 37,144 | 0.0067 | 0.9933 | 99.83 |
| 2.5 | 4,716,380 | 82,946 | 0.0176 | 0.9824 | 99.17 |
| 3.5 | 4,549,851 | 519,232 | 0.1141 | 0.8859 | 97.42 |
| 4.5 | 3,873,671 | 1,366,461 | 0.3528 | 0.6472 | 86.30 |
| 5.5 | 2,415,547 | 712,674 | 0.2950 | 0.7050 | 55.86 |
| 6.5 | 1,545,938 | 516,406 | 0.3340 | 0.6660 | 39.38 |
| 7.5 | 957,240 | 392,250 | 0.4098 | 0.5902 | 26.23 |
| 8.5 | 518,137 | 159,155 | 0.3072 | 0.6928 | 15.48 |
| 9.5 | 358,982 | 176,273 | 0.4910 | 0.5090 | 10.72 |
| 10.5 | 182,710 | 77,992 | 0.4269 | 0.5731 | 5.46 |
| 11.5 | 104,718 | 31,186 | 0.2978 | 0.7022 | 3.13 |
| 12.5 | 73,531 | 33,933 | 0.4615 | 0.5385 | 2.20 |
| 13.5 | 39,598 | 14,207 | 0.3588 | 0.6412 | 1.18 |
| 14.5 | 25,391 | 13,188 | 0.5194 | 0.4806 | 0.76 |
| 15.5 | 12,203 | 1,071 | 0.0877 | 0.9123 | 0.36 |
| 16.5 | 11,133 | | 0.0000 | 1.0000 | 0.33 |
| 17.5 | 11,133 | 4,833 | 0.4341 | 0.5659 | 0.33 |
| 18.5 | 6,300 | 6,300 | 1.0000 | | 0.19 |
| 19.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M12 - MOBILE - MIR COMPRESSOR, ATTACHMENT AND BOAT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

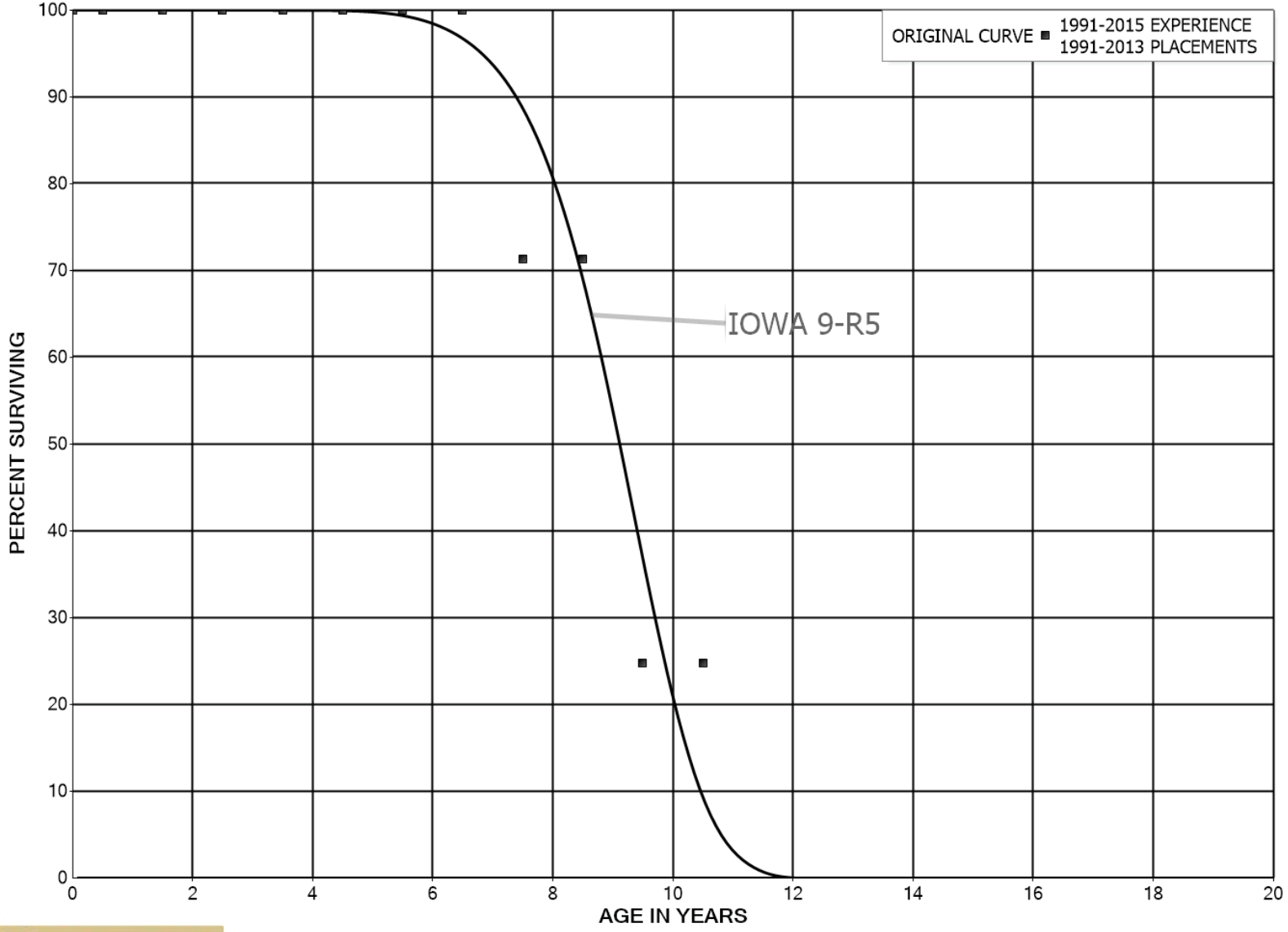
ACCOUNT M12 - MOBILE - MIR COMPRESSOR, ATTACHMENT AND BOAT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1970-2012 EXPERIENCE BAND 1970-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 1,224,589 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 1,224,589 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 1,224,589 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 1,224,589 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,188,949 | 59,529 | 0.0501 | 0.9499 | 100.00 |
| 4.5 | 1,105,020 | 37,266 | 0.0337 | 0.9663 | 94.99 |
| 5.5 | 1,045,065 | 7,416 | 0.0071 | 0.9929 | 91.79 |
| 6.5 | 959,775 | 84,500 | 0.0880 | 0.9120 | 91.14 |
| 7.5 | 875,275 | 8,022 | 0.0092 | 0.9908 | 83.11 |
| 8.5 | 867,253 | 98,926 | 0.1141 | 0.8859 | 82.35 |
| 9.5 | 755,728 | 50,889 | 0.0673 | 0.9327 | 72.96 |
| 10.5 | 704,839 | 35,526 | 0.0504 | 0.9496 | 68.05 |
| 11.5 | 669,313 | 7,614 | 0.0114 | 0.9886 | 64.62 |
| 12.5 | 661,699 | 21,388 | 0.0323 | 0.9677 | 63.88 |
| 13.5 | 640,312 | 49,093 | 0.0767 | 0.9233 | 61.82 |
| 14.5 | 591,218 | 41,556 | 0.0703 | 0.9297 | 57.08 |
| 15.5 | 531,667 | 47,217 | 0.0888 | 0.9112 | 53.06 |
| 16.5 | 453,233 | | 0.0000 | 1.0000 | 48.35 |
| 17.5 | 450,858 | 3,364 | 0.0075 | 0.9925 | 48.35 |
| 18.5 | 434,593 | | 0.0000 | 1.0000 | 47.99 |
| 19.5 | 422,611 | 69,632 | 0.1648 | 0.8352 | 47.99 |
| 20.5 | 352,979 | 39,071 | 0.1107 | 0.8893 | 40.08 |
| 21.5 | 309,846 | | 0.0000 | 1.0000 | 35.65 |
| 22.5 | 296,362 | | 0.0000 | 1.0000 | 35.65 |
| 23.5 | 296,362 | | 0.0000 | 1.0000 | 35.65 |
| 24.5 | 296,362 | 12,913 | 0.0436 | 0.9564 | 35.65 |
| 25.5 | 283,449 | 54,660 | 0.1928 | 0.8072 | 34.09 |
| 26.5 | 203,120 | 6,463 | 0.0318 | 0.9682 | 27.52 |
| 27.5 | 163,907 | | 0.0000 | 1.0000 | 26.64 |
| 28.5 | 163,907 | | 0.0000 | 1.0000 | 26.64 |
| 29.5 | 148,497 | | 0.0000 | 1.0000 | 26.64 |
| 30.5 | 148,497 | 28,470 | 0.1917 | 0.8083 | 26.64 |
| 31.5 | 120,027 | 27,712 | 0.2309 | 0.7691 | 21.54 |
| 32.5 | 92,316 | | 0.0000 | 1.0000 | 16.56 |
| 33.5 | 92,316 | 1,318 | 0.0143 | 0.9857 | 16.56 |
| 34.5 | 87,567 | | 0.0000 | 1.0000 | 16.33 |
| 35.5 | 87,567 | | 0.0000 | 1.0000 | 16.33 |
| 36.5 | | | | | 16.33 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M13 - MOBILE - ARGO'S
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

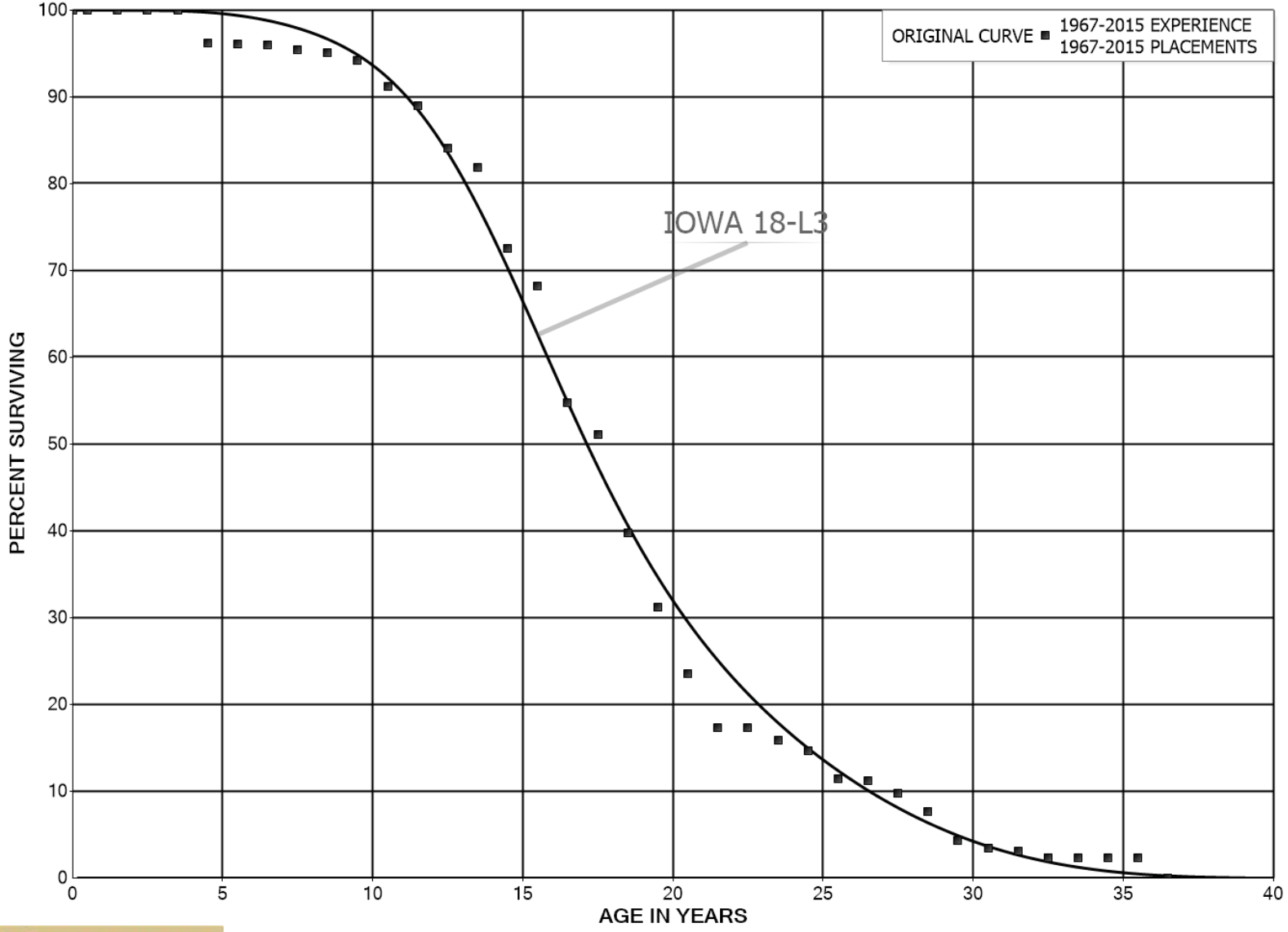
ACCOUNT M13 - MOBILE - ARGO'S

ORIGINAL LIFE TABLE

PLACEMENT BAND 1991-2013 EXPERIENCE BAND 1991-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 343,875 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 343,875 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 343,875 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 255,321 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 195,827 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 173,588 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 56,588 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 56,588 | 16,220 | 0.2866 | 0.7134 | 100.00 |
| 7.5 | 40,368 | | 0.0000 | 1.0000 | 71.34 |
| 8.5 | 40,368 | 26,377 | 0.6534 | 0.3466 | 71.34 |
| 9.5 | 13,991 | | 0.0000 | 1.0000 | 24.72 |
| 10.5 | 13,991 | | 0.0000 | 1.0000 | 24.72 |
| 11.5 | 13,991 | | 0.0000 | 1.0000 | 24.72 |
| 12.5 | 13,991 | | 0.0000 | 1.0000 | 24.72 |
| 13.5 | 13,991 | | 0.0000 | 1.0000 | 24.72 |
| 14.5 | 13,991 | | 0.0000 | 1.0000 | 24.72 |
| 15.5 | 13,991 | | 0.0000 | 1.0000 | 24.72 |
| 16.5 | 13,991 | 13,991 | 1.0000 | | 24.72 |
| 17.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M14 - MOBILE - FLEX/FORK/LOAD/GRADE/MUSK/TRAILER
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

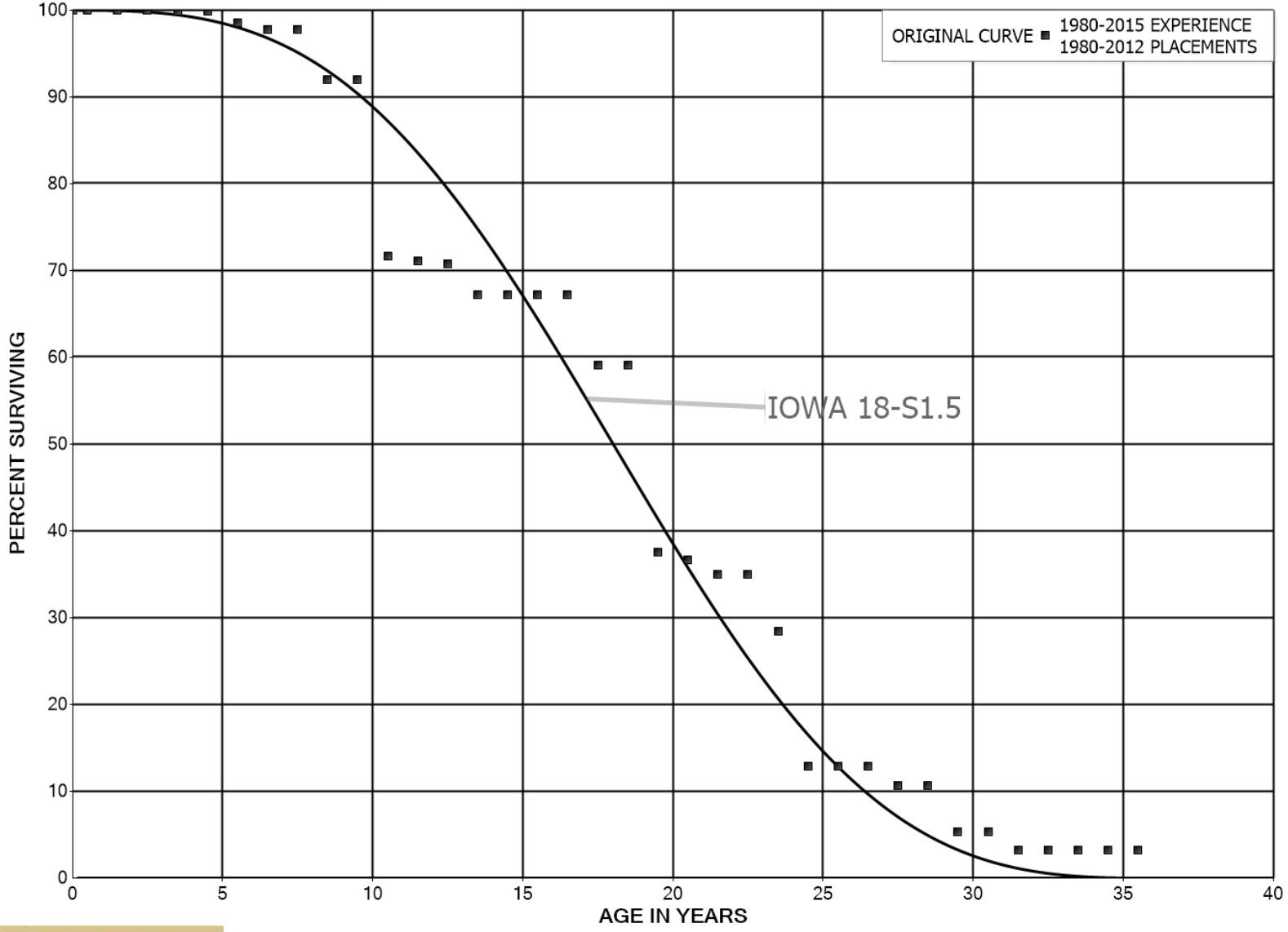
ACCOUNT M14 - MOBILE - FLEX/FORK/LOAD/GRADE/MUSK/TRAILER

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 17,876,198 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 17,492,063 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 16,005,972 | 0 | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 15,642,741 | 9,892 | 0.0006 | 0.9994 | 100.00 |
| 3.5 | 14,813,600 | 559,521 | 0.0378 | 0.9622 | 99.94 |
| 4.5 | 12,476,888 | 11,479 | 0.0009 | 0.9991 | 96.16 |
| 5.5 | 12,113,243 | 11,947 | 0.0010 | 0.9990 | 96.07 |
| 6.5 | 11,249,730 | 73,783 | 0.0066 | 0.9934 | 95.98 |
| 7.5 | 10,011,091 | 27,984 | 0.0028 | 0.9972 | 95.35 |
| 8.5 | 9,586,856 | 95,432 | 0.0100 | 0.9900 | 95.08 |
| 9.5 | 8,869,152 | 279,013 | 0.0315 | 0.9685 | 94.14 |
| 10.5 | 8,261,883 | 197,041 | 0.0238 | 0.9762 | 91.17 |
| 11.5 | 7,928,206 | 440,074 | 0.0555 | 0.9445 | 89.00 |
| 12.5 | 7,472,133 | 200,225 | 0.0268 | 0.9732 | 84.06 |
| 13.5 | 7,092,222 | 810,533 | 0.1143 | 0.8857 | 81.81 |
| 14.5 | 5,998,929 | 353,540 | 0.0589 | 0.9411 | 72.46 |
| 15.5 | 5,423,264 | 1,070,658 | 0.1974 | 0.8026 | 68.19 |
| 16.5 | 4,068,796 | 270,498 | 0.0665 | 0.9335 | 54.73 |
| 17.5 | 3,427,048 | 763,964 | 0.2229 | 0.7771 | 51.09 |
| 18.5 | 2,663,084 | 571,122 | 0.2145 | 0.7855 | 39.70 |
| 19.5 | 2,091,962 | 518,478 | 0.2478 | 0.7522 | 31.19 |
| 20.5 | 1,543,051 | 404,290 | 0.2620 | 0.7380 | 23.46 |
| 21.5 | 1,138,762 | 4,981 | 0.0044 | 0.9956 | 17.31 |
| 22.5 | 1,096,786 | 90,283 | 0.0823 | 0.9177 | 17.24 |
| 23.5 | 861,199 | 66,170 | 0.0768 | 0.9232 | 15.82 |
| 24.5 | 795,030 | 175,879 | 0.2212 | 0.7788 | 14.60 |
| 25.5 | 575,470 | 10,742 | 0.0187 | 0.9813 | 11.37 |
| 26.5 | 478,531 | 59,596 | 0.1245 | 0.8755 | 11.16 |
| 27.5 | 284,228 | 62,203 | 0.2188 | 0.7812 | 9.77 |
| 28.5 | 222,025 | 97,733 | 0.4402 | 0.5598 | 7.63 |
| 29.5 | 124,292 | 26,479 | 0.2130 | 0.7870 | 4.27 |
| 30.5 | 97,813 | 7,383 | 0.0755 | 0.9245 | 3.36 |
| 31.5 | 77,352 | 21,478 | 0.2777 | 0.7223 | 3.11 |
| 32.5 | 55,874 | 0 | 0.0000 | 1.0000 | 2.25 |
| 33.5 | 45,230 | | 0.0000 | 1.0000 | 2.25 |
| 34.5 | 2,486 | | 0.0000 | 1.0000 | 2.25 |
| 35.5 | 2,486 | 2,486 | 1.0000 | 0.0000 | 2.25 |
| 36.5 | 0 | | 0.0000 | 1.0000 | 0.00 |
| 37.5 | 0 | 0 | 1.0000 | | 0.00 |
| 38.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT M16 - MULTIPLEX EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

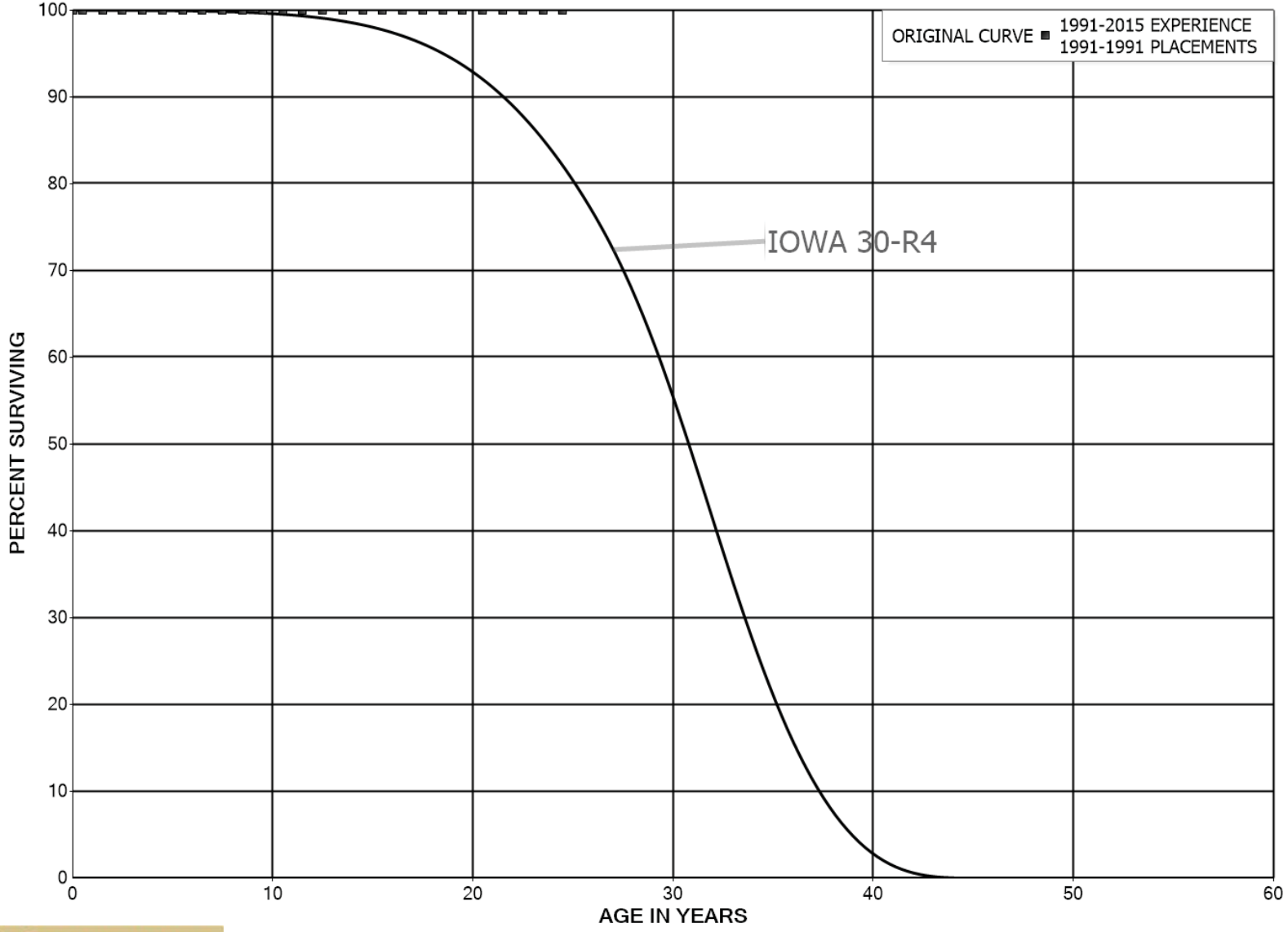
ACCOUNT M16 - MULTIPLEX EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1980-2012 EXPERIENCE BAND 1980-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 5,919,915 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 5,919,915 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 5,919,915 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 5,919,915 | 9,167 | 0.0015 | 0.9985 | 100.00 |
| 3.5 | 5,730,526 | | 0.0000 | 1.0000 | 99.85 |
| 4.5 | 5,718,497 | 74,748 | 0.0131 | 0.9869 | 99.85 |
| 5.5 | 5,148,445 | 43,977 | 0.0085 | 0.9915 | 98.54 |
| 6.5 | 5,104,468 | | 0.0000 | 1.0000 | 97.70 |
| 7.5 | 4,965,470 | 290,128 | 0.0584 | 0.9416 | 97.70 |
| 8.5 | 4,675,342 | | 0.0000 | 1.0000 | 91.99 |
| 9.5 | 4,675,342 | 1,033,622 | 0.2211 | 0.7789 | 91.99 |
| 10.5 | 3,578,900 | 29,019 | 0.0081 | 0.9919 | 71.65 |
| 11.5 | 3,545,061 | 15,324 | 0.0043 | 0.9957 | 71.07 |
| 12.5 | 2,920,159 | 149,749 | 0.0513 | 0.9487 | 70.76 |
| 13.5 | 2,416,439 | | 0.0000 | 1.0000 | 67.14 |
| 14.5 | 1,679,635 | | 0.0000 | 1.0000 | 67.14 |
| 15.5 | 1,571,171 | | 0.0000 | 1.0000 | 67.14 |
| 16.5 | 1,533,979 | 184,775 | 0.1205 | 0.8795 | 67.14 |
| 17.5 | 1,349,204 | | 0.0000 | 1.0000 | 59.05 |
| 18.5 | 1,349,204 | 492,737 | 0.3652 | 0.6348 | 59.05 |
| 19.5 | 856,467 | 20,354 | 0.0238 | 0.9762 | 37.48 |
| 20.5 | 836,113 | 37,588 | 0.0450 | 0.9550 | 36.59 |
| 21.5 | 798,525 | | 0.0000 | 1.0000 | 34.95 |
| 22.5 | 798,525 | 149,665 | 0.1874 | 0.8126 | 34.95 |
| 23.5 | 648,861 | 354,510 | 0.5464 | 0.4536 | 28.40 |
| 24.5 | 294,351 | | 0.0000 | 1.0000 | 12.88 |
| 25.5 | 294,351 | | 0.0000 | 1.0000 | 12.88 |
| 26.5 | 294,351 | 52,098 | 0.1770 | 0.8230 | 12.88 |
| 27.5 | 242,253 | | 0.0000 | 1.0000 | 10.60 |
| 28.5 | 242,253 | 121,314 | 0.5008 | 0.4992 | 10.60 |
| 29.5 | 120,939 | | 0.0000 | 1.0000 | 5.29 |
| 30.5 | 120,939 | 48,924 | 0.4045 | 0.5955 | 5.29 |
| 31.5 | 72,015 | | 0.0000 | 1.0000 | 3.15 |
| 32.5 | 72,015 | | 0.0000 | 1.0000 | 3.15 |
| 33.5 | 72,015 | | 0.0000 | 1.0000 | 3.15 |
| 34.5 | 72,015 | | 0.0000 | 1.0000 | 3.15 |
| 35.5 | | | | | 3.15 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P01 - P.C.B. STORAGE CONTAINER
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

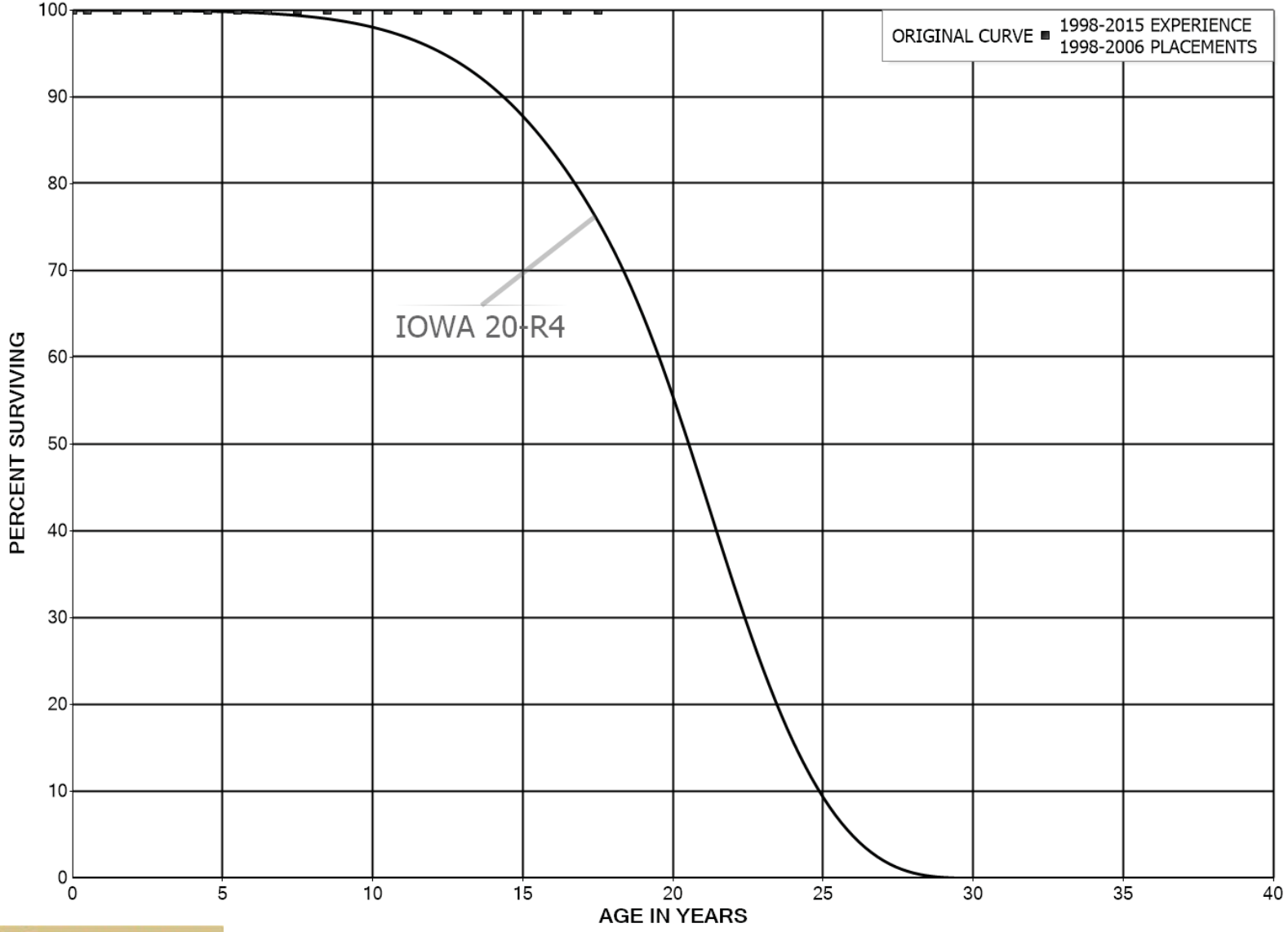
ACCOUNT P01 - P.C.B. STORAGE CONTAINER

ORIGINAL LIFE TABLE

PLACEMENT BAND 1991-1991 EXPERIENCE BAND 1991-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 42,480 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P02 - PRIVATE AUTO BRANCH EXCHANGE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

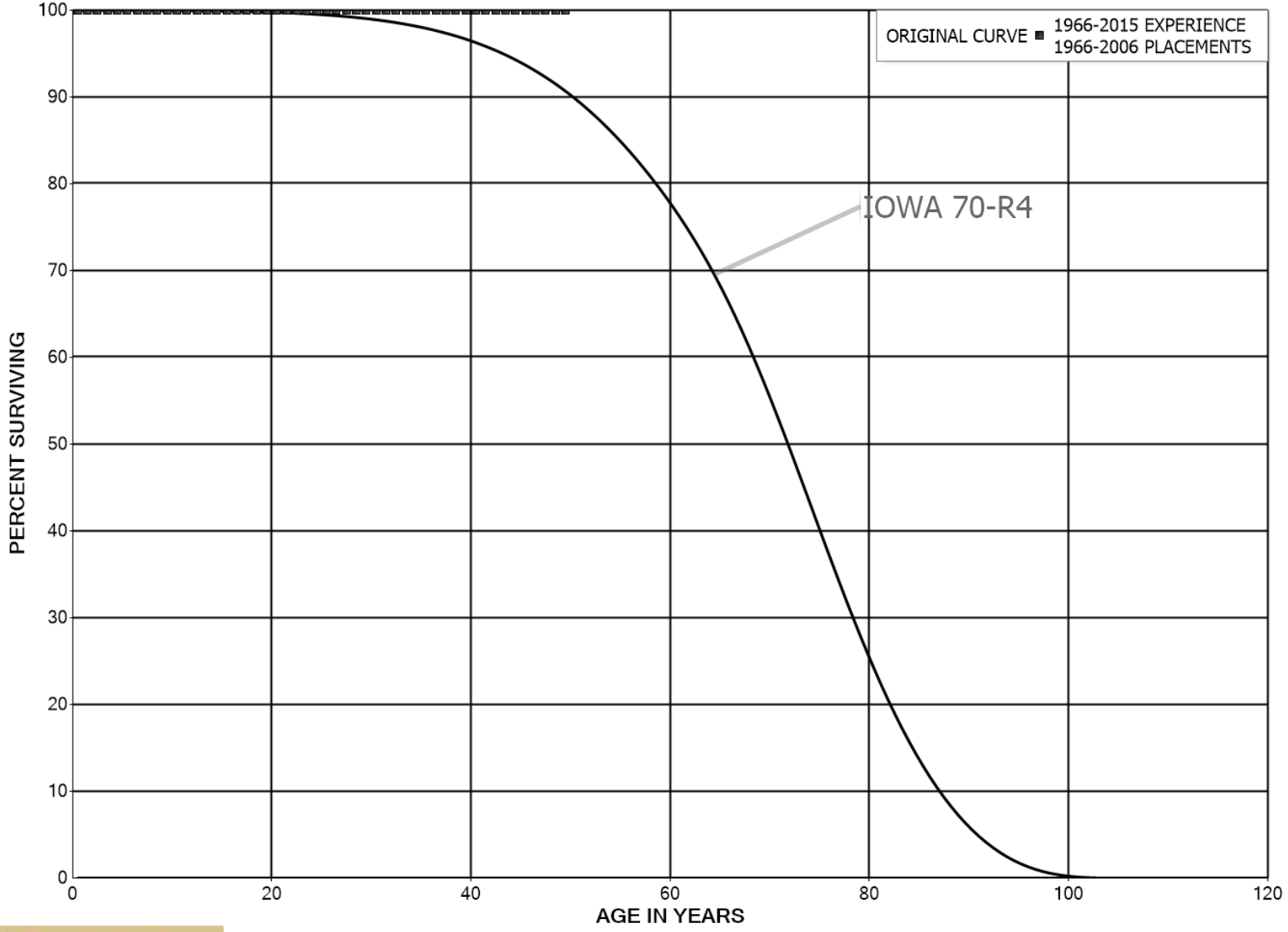
ACCOUNT P02 - PRIVATE AUTO BRANCH EXCHANGE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1998-2006 EXPERIENCE BAND 1998-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 1,181,009 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 1,181,009 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 1,181,009 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 1,181,009 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,181,009 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 1,181,009 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 1,181,009 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 1,181,009 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 1,181,009 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 1,181,009 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 380,481 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 380,481 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 380,481 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 296,149 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 296,149 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 296,149 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 37,492 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 37,492 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P03 - PENSTOCK
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P03 - PENSTOCK

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2006 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 58,908,421 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 58,908,421 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 58,908,421 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 58,908,421 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 58,908,421 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 58,908,421 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 58,908,421 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 58,908,421 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 58,908,421 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 58,908,421 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 56,760,952 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 56,760,952 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 56,760,952 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 50,028,727 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 49,614,170 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 49,614,170 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 49,614,170 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 49,614,170 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 44,923,599 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 44,923,599 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 44,923,599 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 31,951,196 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 31,951,196 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 31,951,196 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 20,920,528 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 20,920,528 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | 20,920,528 | | 0.0000 | 1.0000 | 100.00 |

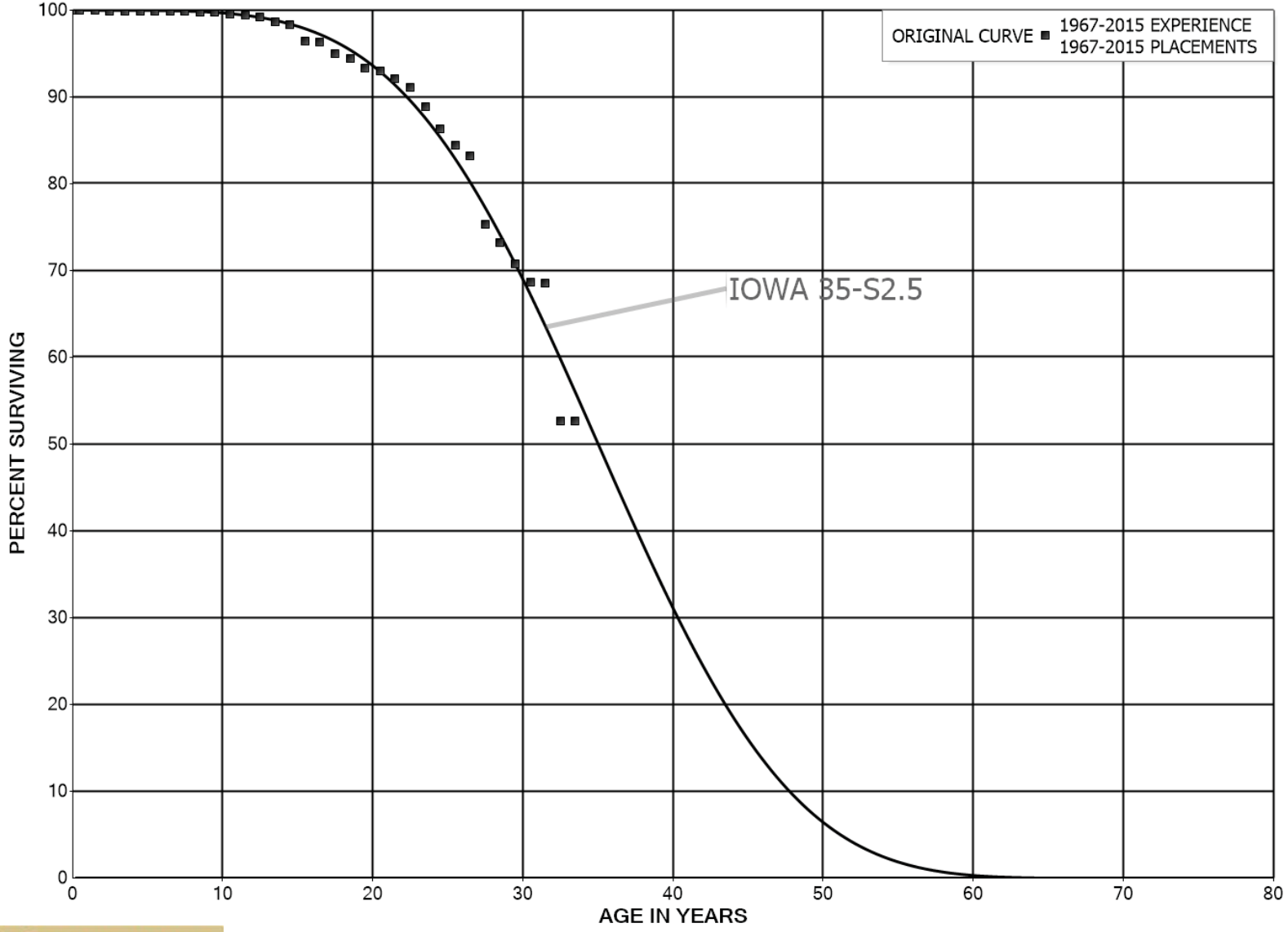
NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P03 - PENSTOCK

ORIGINAL LIFE TABLE, CONT.

| PLACEMENT BAND 1966-2006 | | | EXPERIENCE BAND 1966-2015 | | |
|---|---|---|---|---|---|
| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
| 39.5 | 20,920,528 | | 0.0000 | 1.0000 | 100.00 |
| 40.5 | 20,920,528 | | 0.0000 | 1.0000 | 100.00 |
| 41.5 | 20,920,528 | | 0.0000 | 1.0000 | 100.00 |
| 42.5 | 20,920,528 | | 0.0000 | 1.0000 | 100.00 |
| 43.5 | 20,920,528 | | 0.0000 | 1.0000 | 100.00 |
| 44.5 | 20,920,528 | | 0.0000 | 1.0000 | 100.00 |
| 45.5 | 20,569,173 | | 0.0000 | 1.0000 | 100.00 |
| 46.5 | 20,569,173 | | 0.0000 | 1.0000 | 100.00 |
| 47.5 | 20,569,173 | | 0.0000 | 1.0000 | 100.00 |
| 48.5 | 13,597,173 | | 0.0000 | 1.0000 | 100.00 |
| 49.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P04 - POLE CRIBS AND POLE HARDWARE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P04 - POLE CRIBS AND POLE HARDWARE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 128,071,519 | 13,079 | 0.0001 | 0.9999 | 100.00 |
| 0.5 | 119,928,189 | 1,409 | 0.0000 | 1.0000 | 99.99 |
| 1.5 | 118,045,861 | 168,412 | 0.0014 | 0.9986 | 99.99 |
| 2.5 | 101,937,882 | 334 | 0.0000 | 1.0000 | 99.85 |
| 3.5 | 94,281,980 | 3,838 | 0.0000 | 1.0000 | 99.85 |
| 4.5 | 87,193,005 | 1,365 | 0.0000 | 1.0000 | 99.84 |
| 5.5 | 82,148,886 | 2,253 | 0.0000 | 1.0000 | 99.84 |
| 6.5 | 76,504,284 | 10,701 | 0.0001 | 0.9999 | 99.84 |
| 7.5 | 70,791,042 | 47,163 | 0.0007 | 0.9993 | 99.82 |
| 8.5 | 66,769,994 | 4,606 | 0.0001 | 0.9999 | 99.76 |
| 9.5 | 62,228,255 | 136,209 | 0.0022 | 0.9978 | 99.75 |
| 10.5 | 58,629,230 | 49,983 | 0.0009 | 0.9991 | 99.53 |
| 11.5 | 54,976,388 | 178,942 | 0.0033 | 0.9967 | 99.45 |
| 12.5 | 51,531,940 | 269,870 | 0.0052 | 0.9948 | 99.12 |
| 13.5 | 46,527,439 | 128,839 | 0.0028 | 0.9972 | 98.60 |
| 14.5 | 43,999,472 | 853,523 | 0.0194 | 0.9806 | 98.33 |
| 15.5 | 41,095,562 | 77,359 | 0.0019 | 0.9981 | 96.42 |
| 16.5 | 39,645,688 | 527,125 | 0.0133 | 0.9867 | 96.24 |
| 17.5 | 37,239,882 | 236,143 | 0.0063 | 0.9937 | 94.96 |
| 18.5 | 32,118,454 | 361,539 | 0.0113 | 0.9887 | 94.36 |
| 19.5 | 29,123,498 | 90,892 | 0.0031 | 0.9969 | 93.30 |
| 20.5 | 27,171,095 | 266,486 | 0.0098 | 0.9902 | 93.01 |
| 21.5 | 25,324,911 | 281,449 | 0.0111 | 0.9889 | 92.09 |
| 22.5 | 23,751,430 | 587,323 | 0.0247 | 0.9753 | 91.07 |
| 23.5 | 22,068,413 | 627,221 | 0.0284 | 0.9716 | 88.82 |
| 24.5 | 19,674,036 | 431,812 | 0.0219 | 0.9781 | 86.29 |
| 25.5 | 17,480,564 | 263,135 | 0.0151 | 0.9849 | 84.40 |
| 26.5 | 15,521,387 | 1,473,870 | 0.0950 | 0.9050 | 83.13 |
| 27.5 | 12,892,687 | 360,356 | 0.0280 | 0.9720 | 75.24 |
| 28.5 | 10,381,049 | 345,037 | 0.0332 | 0.9668 | 73.13 |
| 29.5 | 8,842,401 | 255,623 | 0.0289 | 0.9711 | 70.70 |
| 30.5 | 7,850,257 | 18,235 | 0.0023 | 0.9977 | 68.66 |
| 31.5 | 6,935,636 | 1,604,104 | 0.2313 | 0.7687 | 68.50 |
| 32.5 | 4,603,834 | 621 | 0.0001 | 0.9999 | 52.66 |
| 33.5 | 3,174,930 | 2,029 | 0.0006 | 0.9994 | 52.65 |
| 34.5 | 111,582 | 10,434 | 0.0935 | 0.9065 | 52.62 |
| 35.5 | 101,148 | | 0.0000 | 1.0000 | 47.70 |
| 36.5 | 99,734 | 4,429 | 0.0444 | 0.9556 | 47.70 |
| 37.5 | 83,544 | 3,452 | 0.0413 | 0.9587 | 45.58 |
| 38.5 | 80,092 | | 0.0000 | 1.0000 | 43.69 |

NEWFOUNDLAND AND LABRADOR HYDRO

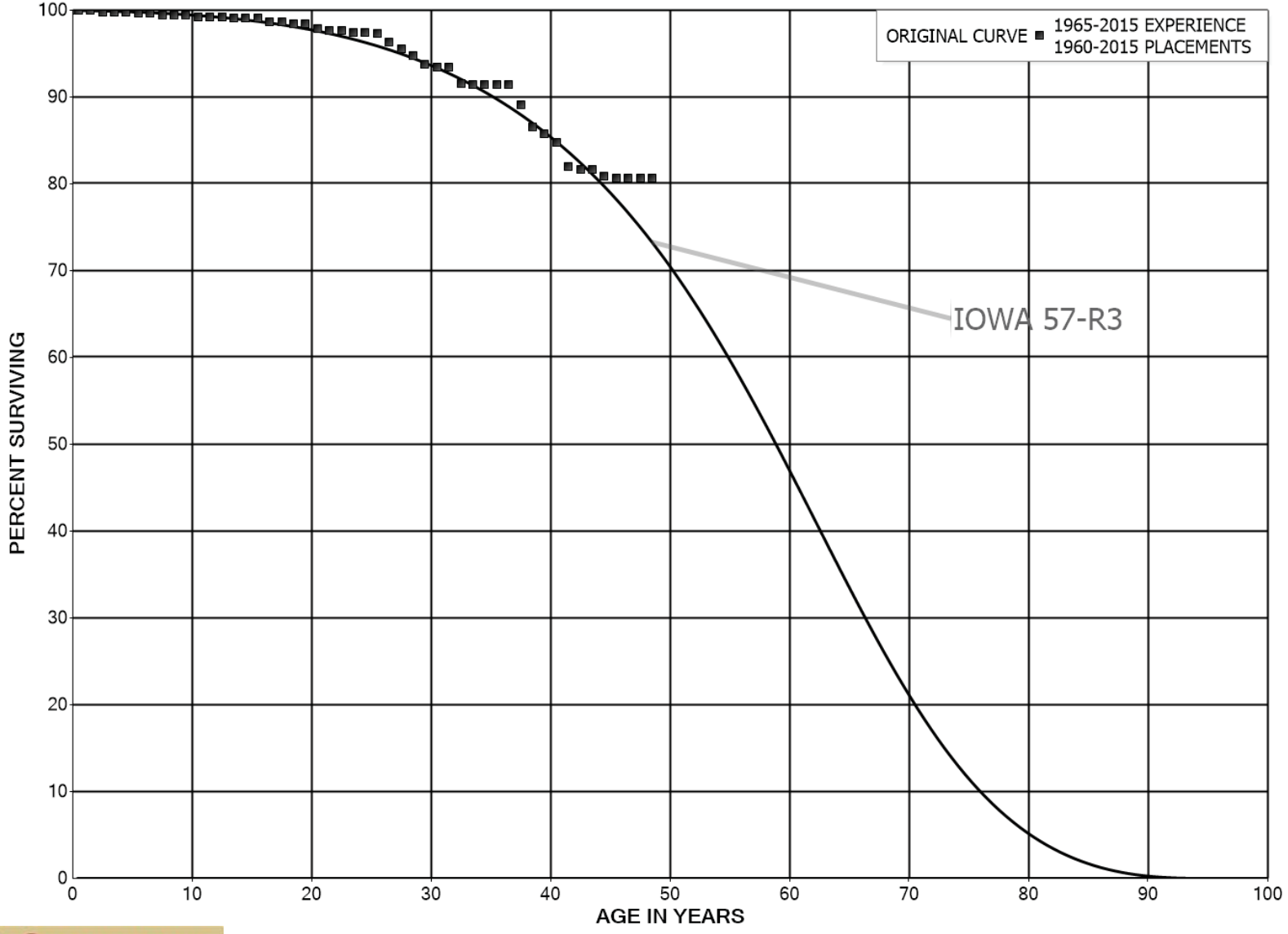
ACCOUNT P04 - POLE CRIBS AND POLE HARDWARE

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 80,092 | 1,160 | 0.0145 | 0.9855 | 43.69 |
| 40.5 | 78,932 | | 0.0000 | 1.0000 | 43.06 |
| 41.5 | 78,932 | | 0.0000 | 1.0000 | 43.06 |
| 42.5 | 78,932 | | 0.0000 | 1.0000 | 43.06 |
| 43.5 | 78,932 | | 0.0000 | 1.0000 | 43.06 |
| 44.5 | 78,932 | | 0.0000 | 1.0000 | 43.06 |
| 45.5 | 1,845 | | 0.0000 | 1.0000 | 43.06 |
| 46.5 | 1,845 | | 0.0000 | 1.0000 | 43.06 |
| 47.5 | | | | | 43.06 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P05 - POLE STRUCTURES - WOOD
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P05 - POLE STRUCTURES - WOOD

ORIGINAL LIFE TABLE

PLACEMENT BAND 1960-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 135,794,090 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 131,957,484 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 127,172,604 | 337,672 | 0.0027 | 0.9973 | 100.00 |
| 2.5 | 124,343,720 | | 0.0000 | 1.0000 | 99.73 |
| 3.5 | 121,844,733 | 12,298 | 0.0001 | 0.9999 | 99.73 |
| 4.5 | 118,272,859 | 112,436 | 0.0010 | 0.9990 | 99.72 |
| 5.5 | 117,568,751 | 13,981 | 0.0001 | 0.9999 | 99.63 |
| 6.5 | 114,509,260 | 212,848 | 0.0019 | 0.9981 | 99.62 |
| 7.5 | 111,437,597 | 16,188 | 0.0001 | 0.9999 | 99.43 |
| 8.5 | 110,933,863 | 35,151 | 0.0003 | 0.9997 | 99.42 |
| 9.5 | 106,346,800 | 234,549 | 0.0022 | 0.9978 | 99.39 |
| 10.5 | 103,596,673 | | 0.0000 | 1.0000 | 99.17 |
| 11.5 | 103,141,550 | | 0.0000 | 1.0000 | 99.17 |
| 12.5 | 98,855,866 | 102,297 | 0.0010 | 0.9990 | 99.17 |
| 13.5 | 97,646,721 | | 0.0000 | 1.0000 | 99.06 |
| 14.5 | 93,443,406 | | 0.0000 | 1.0000 | 99.06 |
| 15.5 | 86,662,267 | 418,135 | 0.0048 | 0.9952 | 99.06 |
| 16.5 | 86,162,302 | | 0.0000 | 1.0000 | 98.59 |
| 17.5 | 82,915,154 | 166,301 | 0.0020 | 0.9980 | 98.59 |
| 18.5 | 82,464,363 | 28,403 | 0.0003 | 0.9997 | 98.39 |
| 19.5 | 76,421,769 | 444,290 | 0.0058 | 0.9942 | 98.36 |
| 20.5 | 72,949,918 | 96,255 | 0.0013 | 0.9987 | 97.78 |
| 21.5 | 72,737,944 | 28,205 | 0.0004 | 0.9996 | 97.65 |
| 22.5 | 72,582,415 | 127,411 | 0.0018 | 0.9982 | 97.62 |
| 23.5 | 72,311,898 | 75,469 | 0.0010 | 0.9990 | 97.45 |
| 24.5 | 72,013,176 | 67,071 | 0.0009 | 0.9991 | 97.34 |
| 25.5 | 48,011,423 | 463,896 | 0.0097 | 0.9903 | 97.25 |
| 26.5 | 46,962,028 | 380,463 | 0.0081 | 0.9919 | 96.31 |
| 27.5 | 43,941,372 | 368,422 | 0.0084 | 0.9916 | 95.53 |
| 28.5 | 38,765,136 | 428,013 | 0.0110 | 0.9890 | 94.73 |
| 29.5 | 38,167,539 | 100,429 | 0.0026 | 0.9974 | 93.69 |
| 30.5 | 36,025,707 | 6,855 | 0.0002 | 0.9998 | 93.44 |
| 31.5 | 35,575,825 | 731,323 | 0.0206 | 0.9794 | 93.42 |
| 32.5 | 29,055,987 | 21,318 | 0.0007 | 0.9993 | 91.50 |
| 33.5 | 22,184,602 | 7,549 | 0.0003 | 0.9997 | 91.43 |
| 34.5 | 16,158,260 | 2,301 | 0.0001 | 0.9999 | 91.40 |
| 35.5 | 15,288,343 | 1,480 | 0.0001 | 0.9999 | 91.39 |
| 36.5 | 15,282,951 | 380,974 | 0.0249 | 0.9751 | 91.38 |
| 37.5 | 9,302,607 | 268,297 | 0.0288 | 0.9712 | 89.10 |
| 38.5 | 8,744,708 | 82,696 | 0.0095 | 0.9905 | 86.53 |

NEWFOUNDLAND AND LABRADOR HYDRO

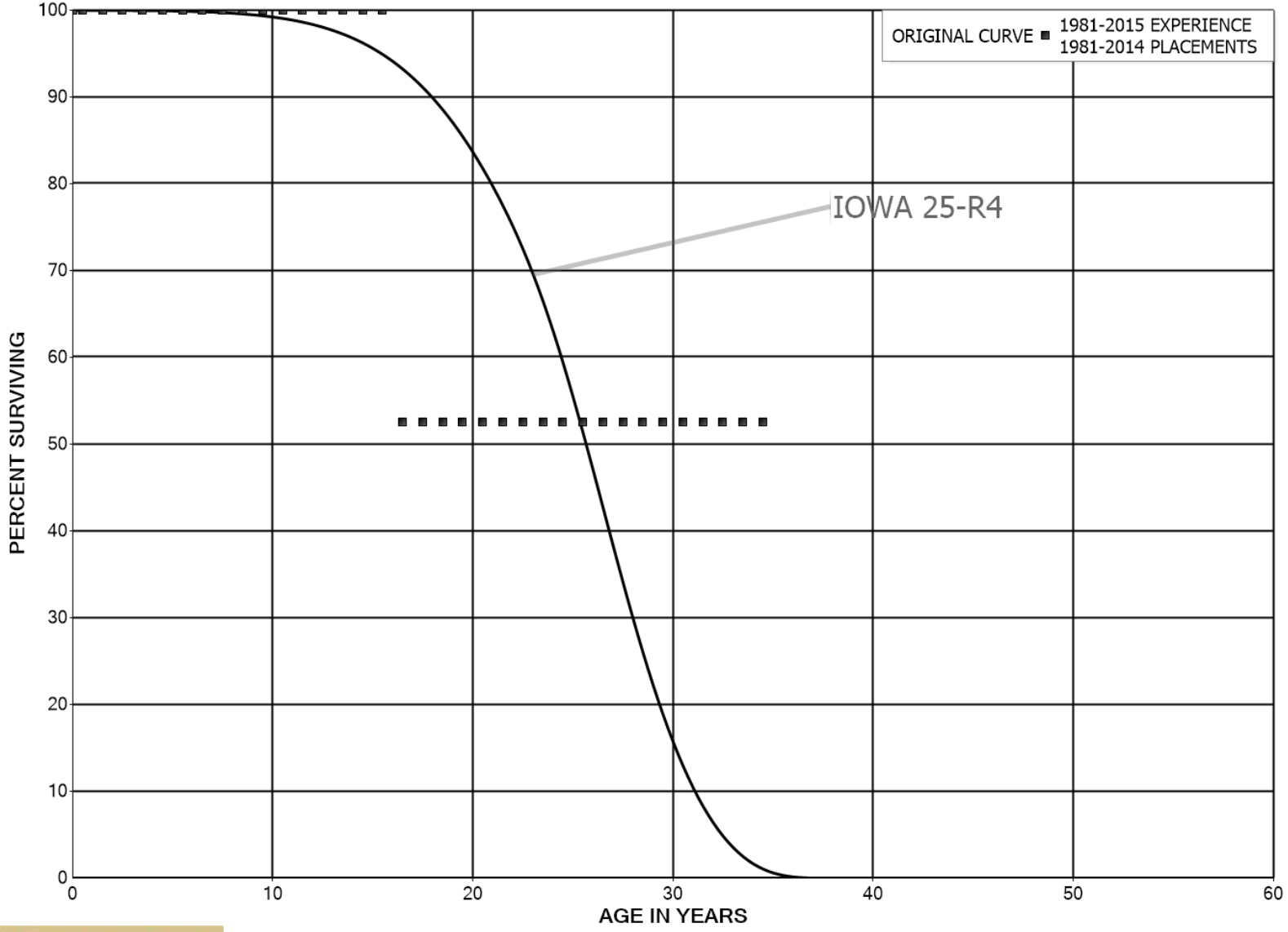
ACCOUNT P05 - POLE STRUCTURES - WOOD

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1960-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 8,550,283 | 97,486 | 0.0114 | 0.9886 | 85.71 |
| 40.5 | 8,448,254 | 277,795 | 0.0329 | 0.9671 | 84.74 |
| 41.5 | 5,360,936 | 24,278 | 0.0045 | 0.9955 | 81.95 |
| 42.5 | 5,336,658 | | 0.0000 | 1.0000 | 81.58 |
| 43.5 | 5,336,658 | 46,880 | 0.0088 | 0.9912 | 81.58 |
| 44.5 | 5,269,090 | 12,661 | 0.0024 | 0.9976 | 80.86 |
| 45.5 | 2,475,936 | | 0.0000 | 1.0000 | 80.67 |
| 46.5 | 2,055,270 | | 0.0000 | 1.0000 | 80.67 |
| 47.5 | 1,368,472 | | 0.0000 | 1.0000 | 80.67 |
| 48.5 | | | | | 80.67 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P06 - POLES - CONCRETE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

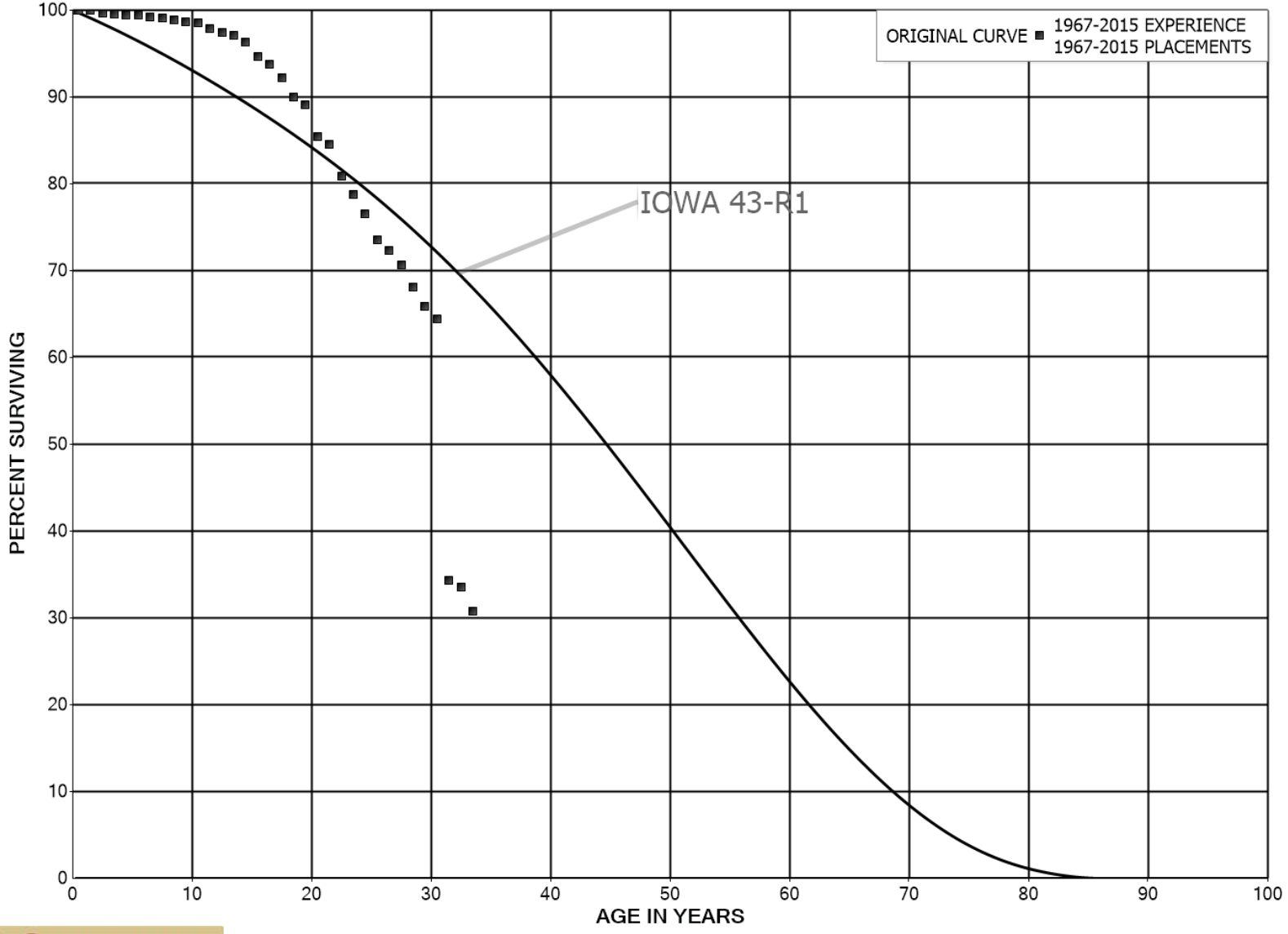
ACCOUNT P06 - POLES - CONCRETE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1981-2014 EXPERIENCE BAND 1981-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 599,885 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 599,885 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 575,788 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 575,788 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 575,788 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 575,788 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 575,788 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 575,788 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 575,788 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 575,788 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 575,788 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 560,013 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 560,013 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 560,013 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 560,013 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 560,013 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 560,013 | 266,125 | 0.4752 | 0.5248 | 100.00 |
| 16.5 | 293,316 | | 0.0000 | 1.0000 | 52.48 |
| 17.5 | 293,316 | | 0.0000 | 1.0000 | 52.48 |
| 18.5 | 291,677 | | 0.0000 | 1.0000 | 52.48 |
| 19.5 | 291,677 | | 0.0000 | 1.0000 | 52.48 |
| 20.5 | 291,677 | | 0.0000 | 1.0000 | 52.48 |
| 21.5 | 257,201 | | 0.0000 | 1.0000 | 52.48 |
| 22.5 | 257,201 | | 0.0000 | 1.0000 | 52.48 |
| 23.5 | 257,201 | | 0.0000 | 1.0000 | 52.48 |
| 24.5 | 257,201 | | 0.0000 | 1.0000 | 52.48 |
| 25.5 | 234,066 | | 0.0000 | 1.0000 | 52.48 |
| 26.5 | 234,066 | | 0.0000 | 1.0000 | 52.48 |
| 27.5 | 234,066 | | 0.0000 | 1.0000 | 52.48 |
| 28.5 | 223,750 | | 0.0000 | 1.0000 | 52.48 |
| 29.5 | 154,611 | | 0.0000 | 1.0000 | 52.48 |
| 30.5 | 154,611 | | 0.0000 | 1.0000 | 52.48 |
| 31.5 | 95,671 | | 0.0000 | 1.0000 | 52.48 |
| 32.5 | 95,671 | | 0.0000 | 1.0000 | 52.48 |
| 33.5 | 23,208 | | 0.0000 | 1.0000 | 52.48 |
| 34.5 | | | | | 52.48 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P07 - POLES - WOOD
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P07 - POLES - WOOD

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 83,580,934 | 40,059 | 0.0005 | 0.9995 | 100.00 |
| 0.5 | 75,308,999 | 28,423 | 0.0004 | 0.9996 | 99.95 |
| 1.5 | 70,556,380 | 208,455 | 0.0030 | 0.9970 | 99.91 |
| 2.5 | 65,541,762 | 68,646 | 0.0010 | 0.9990 | 99.62 |
| 3.5 | 61,689,873 | 67,574 | 0.0011 | 0.9989 | 99.51 |
| 4.5 | 59,162,963 | 26,767 | 0.0005 | 0.9995 | 99.41 |
| 5.5 | 52,735,804 | 71,829 | 0.0014 | 0.9986 | 99.36 |
| 6.5 | 51,224,152 | 103,083 | 0.0020 | 0.9980 | 99.23 |
| 7.5 | 49,210,897 | 111,679 | 0.0023 | 0.9977 | 99.03 |
| 8.5 | 47,056,044 | 84,825 | 0.0018 | 0.9982 | 98.80 |
| 9.5 | 42,734,152 | 66,534 | 0.0016 | 0.9984 | 98.62 |
| 10.5 | 40,720,690 | 260,085 | 0.0064 | 0.9936 | 98.47 |
| 11.5 | 39,030,080 | 156,707 | 0.0040 | 0.9960 | 97.84 |
| 12.5 | 37,359,461 | 164,429 | 0.0044 | 0.9956 | 97.45 |
| 13.5 | 30,921,577 | 246,717 | 0.0080 | 0.9920 | 97.02 |
| 14.5 | 29,403,583 | 510,161 | 0.0174 | 0.9826 | 96.24 |
| 15.5 | 27,747,417 | 251,517 | 0.0091 | 0.9909 | 94.57 |
| 16.5 | 26,544,727 | 447,461 | 0.0169 | 0.9831 | 93.72 |
| 17.5 | 24,944,338 | 607,529 | 0.0244 | 0.9756 | 92.14 |
| 18.5 | 22,387,909 | 205,456 | 0.0092 | 0.9908 | 89.89 |
| 19.5 | 20,605,159 | 861,043 | 0.0418 | 0.9582 | 89.07 |
| 20.5 | 18,792,449 | 196,789 | 0.0105 | 0.9895 | 85.35 |
| 21.5 | 17,257,295 | 728,894 | 0.0422 | 0.9578 | 84.45 |
| 22.5 | 15,575,912 | 423,108 | 0.0272 | 0.9728 | 80.89 |
| 23.5 | 14,395,418 | 399,475 | 0.0278 | 0.9722 | 78.69 |
| 24.5 | 13,166,348 | 510,198 | 0.0388 | 0.9612 | 76.51 |
| 25.5 | 11,654,551 | 199,912 | 0.0172 | 0.9828 | 73.54 |
| 26.5 | 9,848,035 | 224,445 | 0.0228 | 0.9772 | 72.28 |
| 27.5 | 8,679,615 | 312,730 | 0.0360 | 0.9640 | 70.63 |
| 28.5 | 7,265,878 | 235,291 | 0.0324 | 0.9676 | 68.09 |
| 29.5 | 6,128,894 | 142,688 | 0.0233 | 0.9767 | 65.88 |
| 30.5 | 5,854,651 | 2,737,687 | 0.4676 | 0.5324 | 64.35 |
| 31.5 | 2,686,461 | 55,829 | 0.0208 | 0.9792 | 34.26 |
| 32.5 | 2,282,571 | 191,717 | 0.0840 | 0.9160 | 33.55 |
| 33.5 | 1,604,053 | 25,151 | 0.0157 | 0.9843 | 30.73 |
| 34.5 | 25,456 | | 0.0000 | 1.0000 | 30.25 |
| 35.5 | 25,456 | | 0.0000 | 1.0000 | 30.25 |
| 36.5 | 25,169 | 954 | 0.0379 | 0.9621 | 30.25 |
| 37.5 | 21,294 | 1,929 | 0.0906 | 0.9094 | 29.10 |
| 38.5 | 19,365 | 527 | 0.0272 | 0.9728 | 26.46 |

NEWFOUNDLAND AND LABRADOR HYDRO

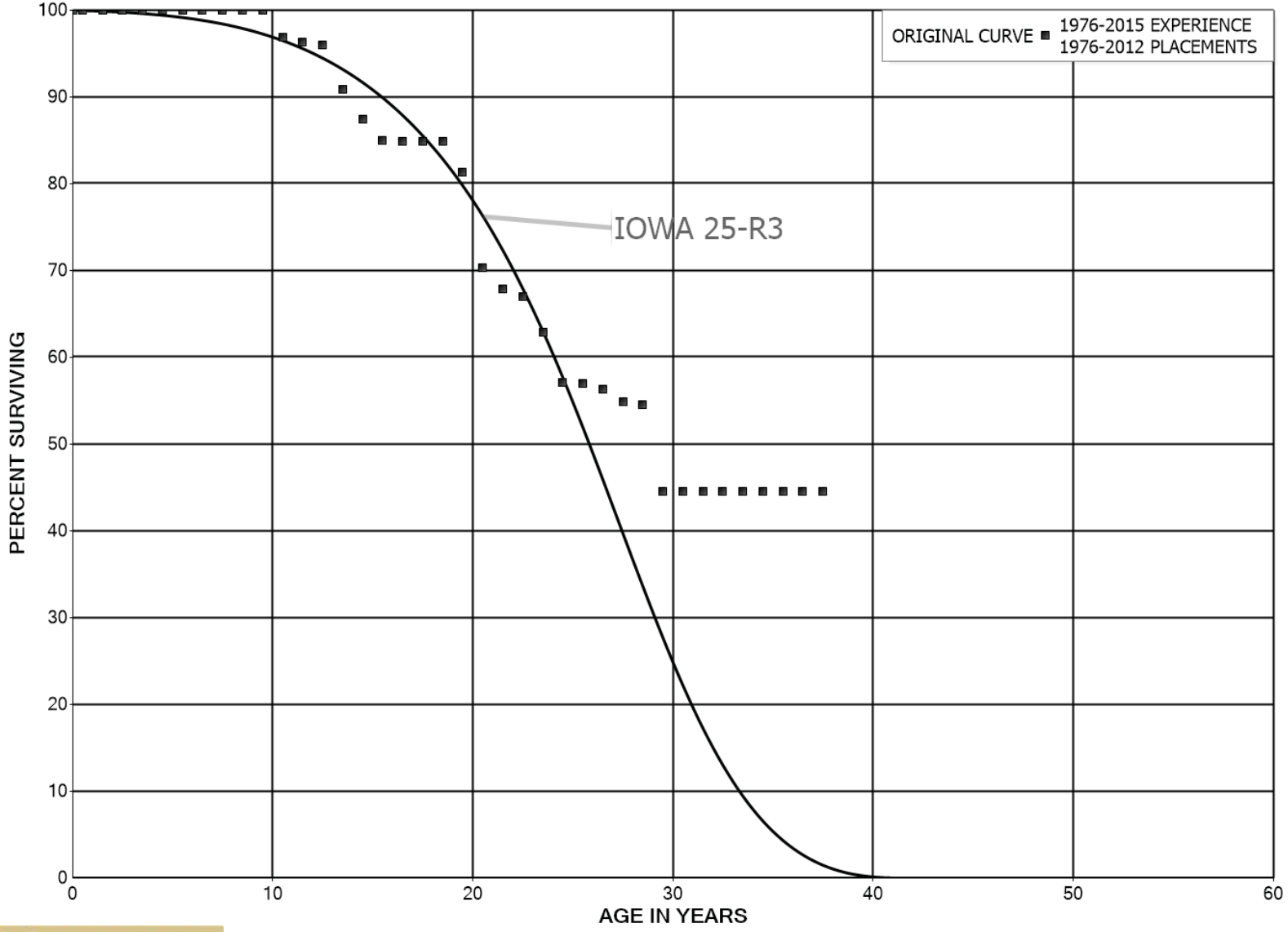
ACCOUNT P07 - POLES - WOOD

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 18,839 | | 0.0000 | 1.0000 | 25.75 |
| 40.5 | 18,839 | | 0.0000 | 1.0000 | 25.75 |
| 41.5 | 18,839 | | 0.0000 | 1.0000 | 25.75 |
| 42.5 | 18,839 | | 0.0000 | 1.0000 | 25.75 |
| 43.5 | 18,839 | | 0.0000 | 1.0000 | 25.75 |
| 44.5 | 18,839 | | 0.0000 | 1.0000 | 25.75 |
| 45.5 | 1,430 | | 0.0000 | 1.0000 | 25.75 |
| 46.5 | 1,430 | | 0.0000 | 1.0000 | 25.75 |
| 47.5 | | | | | 25.75 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P08 - POWER LINE CARRIER
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

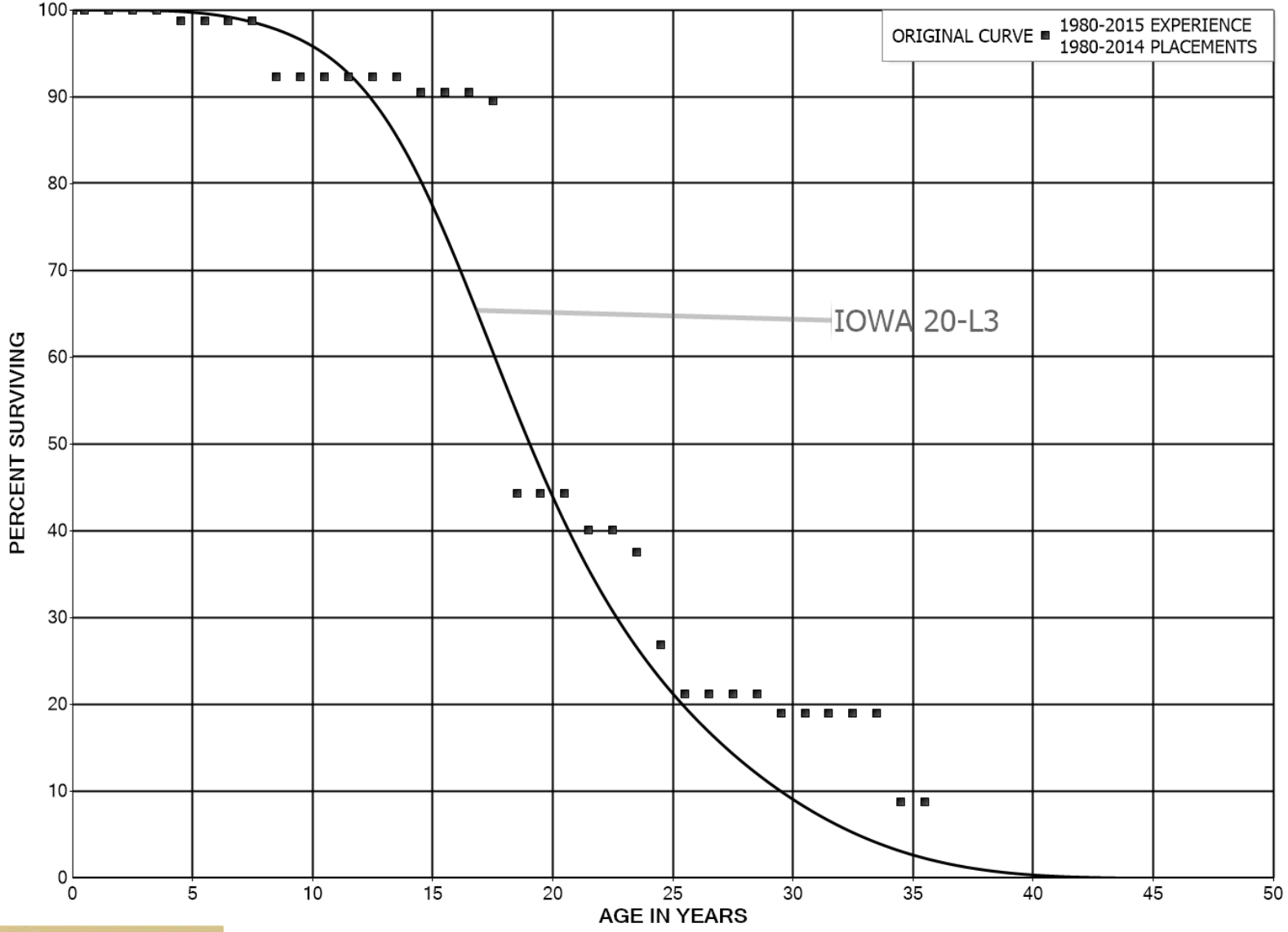
ACCOUNT P08 - POWER LINE CARRIER

ORIGINAL LIFE TABLE

PLACEMENT BAND 1976-2012 EXPERIENCE BAND 1976-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 6,720,295 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 6,720,295 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 6,720,295 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 6,720,295 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 6,709,545 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 6,709,545 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 6,709,545 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 6,358,277 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 5,989,724 | 744 | 0.0001 | 0.9999 | 100.00 |
| 8.5 | 5,988,980 | | 0.0000 | 1.0000 | 99.99 |
| 9.5 | 5,988,980 | 185,763 | 0.0310 | 0.9690 | 99.99 |
| 10.5 | 5,803,217 | 34,114 | 0.0059 | 0.9941 | 96.89 |
| 11.5 | 5,482,029 | 20,092 | 0.0037 | 0.9963 | 96.32 |
| 12.5 | 5,203,757 | 280,286 | 0.0539 | 0.9461 | 95.96 |
| 13.5 | 4,328,816 | 161,080 | 0.0372 | 0.9628 | 90.79 |
| 14.5 | 4,167,736 | 116,380 | 0.0279 | 0.9721 | 87.42 |
| 15.5 | 2,882,813 | 4,683 | 0.0016 | 0.9984 | 84.98 |
| 16.5 | 2,345,658 | | 0.0000 | 1.0000 | 84.84 |
| 17.5 | 2,345,658 | | 0.0000 | 1.0000 | 84.84 |
| 18.5 | 2,345,658 | 97,722 | 0.0417 | 0.9583 | 84.84 |
| 19.5 | 2,132,112 | 288,410 | 0.1353 | 0.8647 | 81.30 |
| 20.5 | 1,524,034 | 54,146 | 0.0355 | 0.9645 | 70.31 |
| 21.5 | 1,469,888 | 17,575 | 0.0120 | 0.9880 | 67.81 |
| 22.5 | 1,452,313 | 89,404 | 0.0616 | 0.9384 | 67.00 |
| 23.5 | 1,362,910 | 125,054 | 0.0918 | 0.9082 | 62.87 |
| 24.5 | 1,237,856 | 3,286 | 0.0027 | 0.9973 | 57.10 |
| 25.5 | 1,232,572 | 14,196 | 0.0115 | 0.9885 | 56.95 |
| 26.5 | 1,218,377 | 30,612 | 0.0251 | 0.9749 | 56.30 |
| 27.5 | 1,187,764 | 6,999 | 0.0059 | 0.9941 | 54.88 |
| 28.5 | 1,180,765 | 216,792 | 0.1836 | 0.8164 | 54.56 |
| 29.5 | 963,973 | 1,384 | 0.0014 | 0.9986 | 44.54 |
| 30.5 | 962,588 | | 0.0000 | 1.0000 | 44.48 |
| 31.5 | 962,588 | | 0.0000 | 1.0000 | 44.48 |
| 32.5 | 962,588 | | 0.0000 | 1.0000 | 44.48 |
| 33.5 | 952,437 | | 0.0000 | 1.0000 | 44.48 |
| 34.5 | 952,437 | | 0.0000 | 1.0000 | 44.48 |
| 35.5 | 50,795 | | 0.0000 | 1.0000 | 44.48 |
| 36.5 | 50,795 | | 0.0000 | 1.0000 | 44.48 |
| 37.5 | | | | | 44.48 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P09 - POWER SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

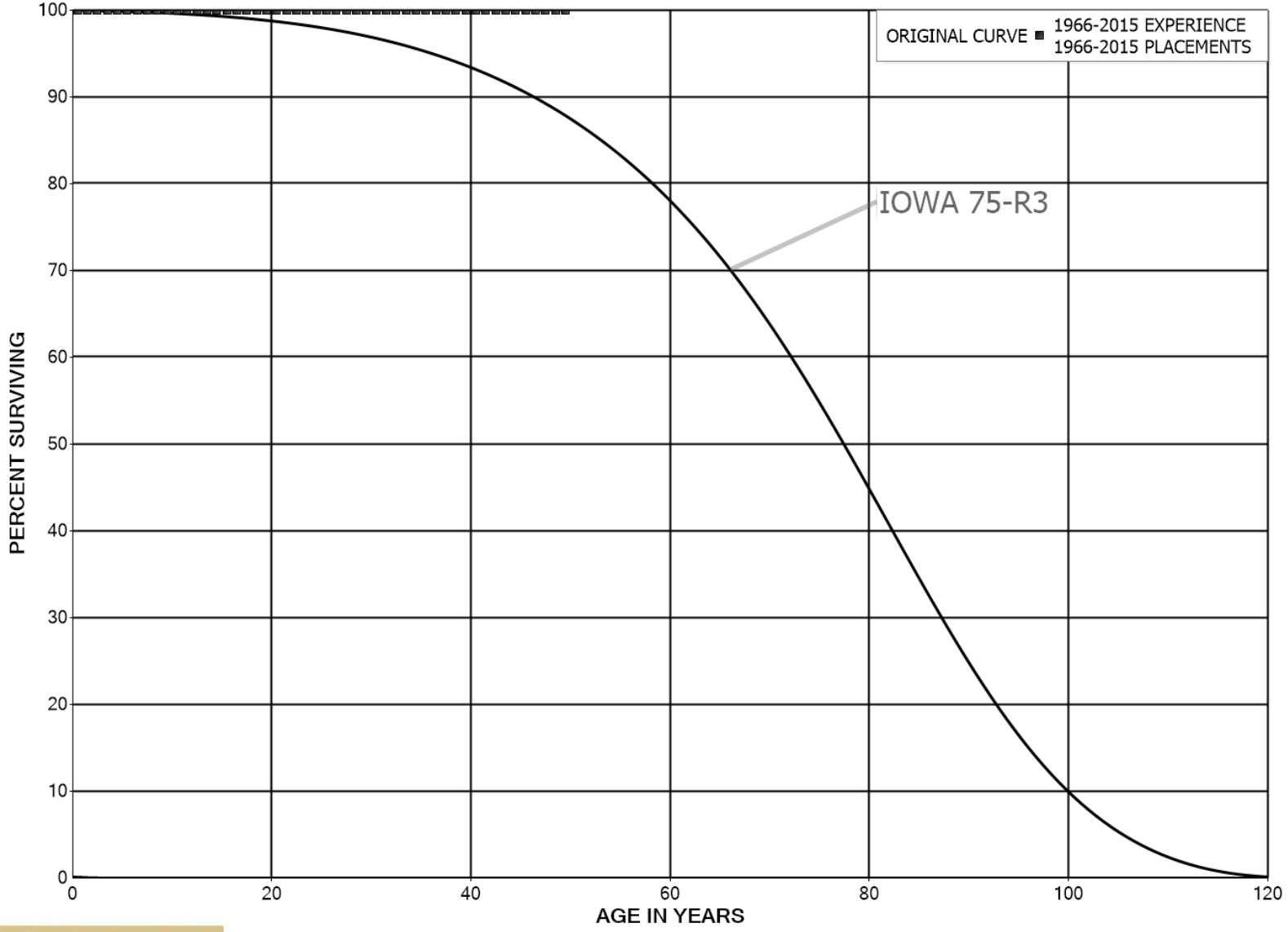
ACCOUNT P09 - POWER SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1980-2014 EXPERIENCE BAND 1980-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 804,033 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 804,033 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 790,242 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 742,503 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 719,393 | 8,858 | 0.0123 | 0.9877 | 100.00 |
| 4.5 | 710,534 | | 0.0000 | 1.0000 | 98.77 |
| 5.5 | 710,534 | | 0.0000 | 1.0000 | 98.77 |
| 6.5 | 710,534 | | 0.0000 | 1.0000 | 98.77 |
| 7.5 | 685,630 | 45,059 | 0.0657 | 0.9343 | 98.77 |
| 8.5 | 639,484 | | 0.0000 | 1.0000 | 92.28 |
| 9.5 | 543,189 | | 0.0000 | 1.0000 | 92.28 |
| 10.5 | 543,189 | | 0.0000 | 1.0000 | 92.28 |
| 11.5 | 513,756 | | 0.0000 | 1.0000 | 92.28 |
| 12.5 | 139,320 | | 0.0000 | 1.0000 | 92.28 |
| 13.5 | 139,320 | 2,673 | 0.0192 | 0.9808 | 92.28 |
| 14.5 | 136,647 | | 0.0000 | 1.0000 | 90.51 |
| 15.5 | 129,219 | | 0.0000 | 1.0000 | 90.51 |
| 16.5 | 124,816 | 1,456 | 0.0117 | 0.9883 | 90.51 |
| 17.5 | 120,687 | 60,879 | 0.5044 | 0.4956 | 89.45 |
| 18.5 | 30,507 | | 0.0000 | 1.0000 | 44.33 |
| 19.5 | 30,507 | | 0.0000 | 1.0000 | 44.33 |
| 20.5 | 30,507 | 2,900 | 0.0951 | 0.9049 | 44.33 |
| 21.5 | 27,607 | | 0.0000 | 1.0000 | 40.11 |
| 22.5 | 27,607 | 1,774 | 0.0643 | 0.9357 | 40.11 |
| 23.5 | 23,483 | 6,712 | 0.2858 | 0.7142 | 37.54 |
| 24.5 | 16,771 | 3,531 | 0.2105 | 0.7895 | 26.81 |
| 25.5 | 9,538 | | 0.0000 | 1.0000 | 21.16 |
| 26.5 | 9,538 | | 0.0000 | 1.0000 | 21.16 |
| 27.5 | 9,538 | | 0.0000 | 1.0000 | 21.16 |
| 28.5 | 9,538 | 1,000 | 0.1048 | 0.8952 | 21.16 |
| 29.5 | 8,538 | | 0.0000 | 1.0000 | 18.95 |
| 30.5 | 8,538 | | 0.0000 | 1.0000 | 18.95 |
| 31.5 | 8,538 | | 0.0000 | 1.0000 | 18.95 |
| 32.5 | 8,538 | | 0.0000 | 1.0000 | 18.95 |
| 33.5 | 8,538 | 4,598 | 0.5386 | 0.4614 | 18.95 |
| 34.5 | 3,940 | | 0.0000 | 1.0000 | 8.74 |
| 35.5 | | | | | 8.74 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P10 - POWERHOUSE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P10 - POWERHOUSE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 102,700,817 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 101,734,797 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 101,329,090 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 101,192,787 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 101,192,787 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 101,192,787 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 101,192,787 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 101,192,787 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 101,082,001 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 101,082,001 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 100,998,712 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 100,998,712 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 100,998,712 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 80,149,101 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 80,149,101 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 80,149,101 | 1,408 | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 80,040,055 | 63,094 | 0.0008 | 0.9992 | 100.00 |
| 16.5 | 79,976,960 | | 0.0000 | 1.0000 | 99.92 |
| 17.5 | 79,967,397 | | 0.0000 | 1.0000 | 99.92 |
| 18.5 | 79,960,122 | | 0.0000 | 1.0000 | 99.92 |
| 19.5 | 79,960,122 | | 0.0000 | 1.0000 | 99.92 |
| 20.5 | 79,811,859 | | 0.0000 | 1.0000 | 99.92 |
| 21.5 | 79,766,978 | | 0.0000 | 1.0000 | 99.92 |
| 22.5 | 77,059,323 | | 0.0000 | 1.0000 | 99.92 |
| 23.5 | 77,059,323 | | 0.0000 | 1.0000 | 99.92 |
| 24.5 | 77,048,404 | | 0.0000 | 1.0000 | 99.92 |
| 25.5 | 77,009,543 | | 0.0000 | 1.0000 | 99.92 |
| 26.5 | 75,938,104 | | 0.0000 | 1.0000 | 99.92 |
| 27.5 | 74,445,854 | | 0.0000 | 1.0000 | 99.92 |
| 28.5 | 74,196,993 | | 0.0000 | 1.0000 | 99.92 |
| 29.5 | 74,186,988 | 12,517 | 0.0002 | 0.9998 | 99.92 |
| 30.5 | 68,169,254 | | 0.0000 | 1.0000 | 99.90 |
| 31.5 | 56,183,499 | | 0.0000 | 1.0000 | 99.90 |
| 32.5 | 51,612,776 | | 0.0000 | 1.0000 | 99.90 |
| 33.5 | 39,057,174 | | 0.0000 | 1.0000 | 99.90 |
| 34.5 | 38,814,548 | 1,272 | 0.0000 | 1.0000 | 99.90 |
| 35.5 | 27,784,412 | | 0.0000 | 1.0000 | 99.90 |
| 36.5 | 21,227,034 | | 0.0000 | 1.0000 | 99.90 |
| 37.5 | 20,143,559 | | 0.0000 | 1.0000 | 99.90 |
| 38.5 | 20,143,559 | | 0.0000 | 1.0000 | 99.90 |

NEWFOUNDLAND AND LABRADOR HYDRO

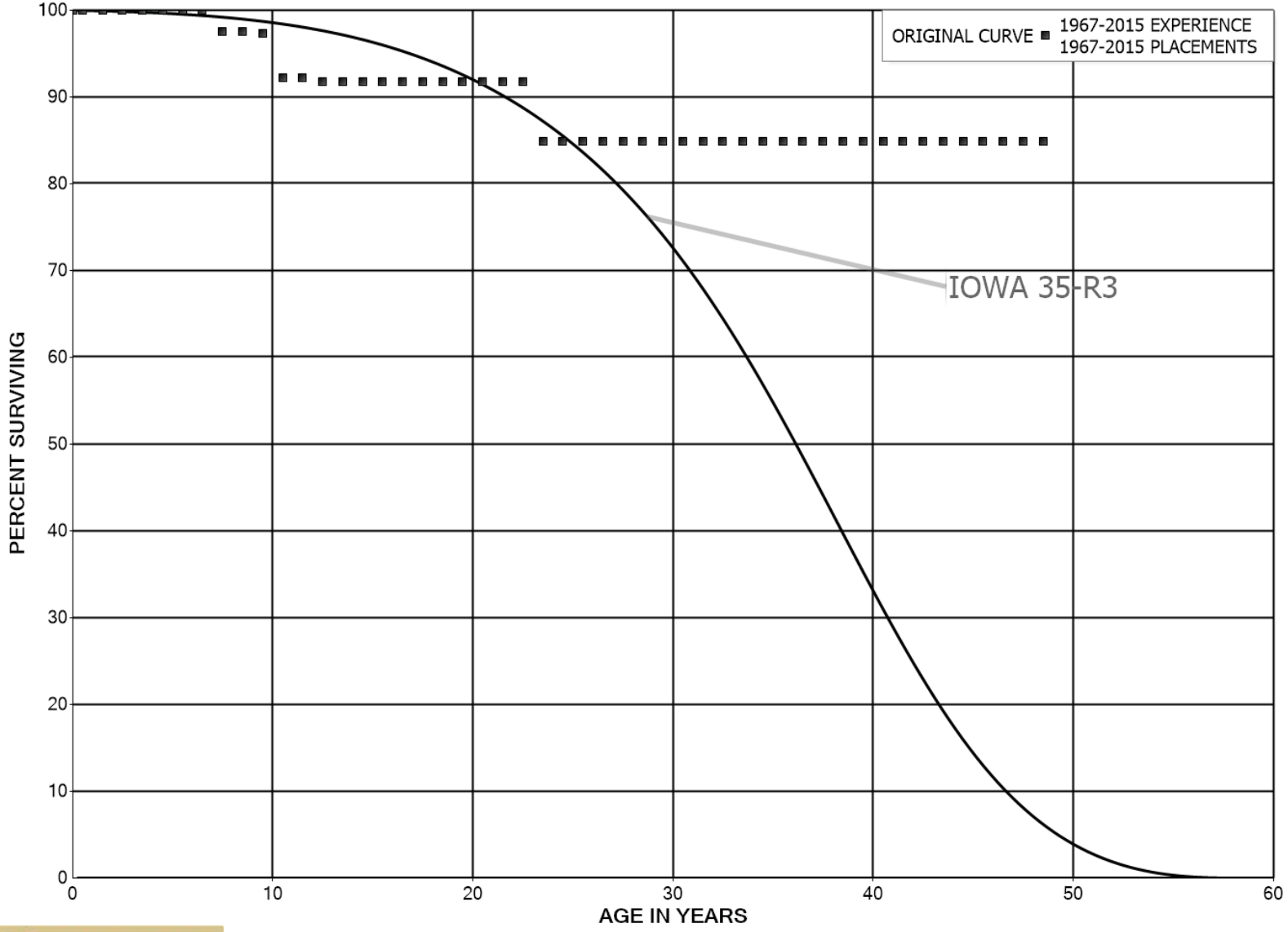
ACCOUNT P10 - POWERHOUSE

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 20,138,559 | | 0.0000 | 1.0000 | 99.90 |
| 40.5 | 20,138,559 | | 0.0000 | 1.0000 | 99.90 |
| 41.5 | 20,138,559 | | 0.0000 | 1.0000 | 99.90 |
| 42.5 | 20,138,559 | 349 | 0.0000 | 1.0000 | 99.90 |
| 43.5 | 20,138,210 | | 0.0000 | 1.0000 | 99.90 |
| 44.5 | 16,547,132 | | 0.0000 | 1.0000 | 99.90 |
| 45.5 | 13,734,007 | | 0.0000 | 1.0000 | 99.90 |
| 46.5 | 10,881,494 | | 0.0000 | 1.0000 | 99.90 |
| 47.5 | 10,881,494 | | 0.0000 | 1.0000 | 99.90 |
| 48.5 | 6,311,169 | | 0.0000 | 1.0000 | 99.90 |
| 49.5 | | | | | 99.90 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT P12 - PROTECTIVE CONTROL AND RELAY PANELS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P12 - PROTECTIVE CONTROL AND RELAY PANELS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 10,018,336 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 9,215,365 | 289 | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 8,790,412 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 6,915,111 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 5,112,300 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 4,840,285 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 4,762,333 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 4,618,882 | 116,342 | 0.0252 | 0.9748 | 100.00 |
| 7.5 | 4,328,679 | | 0.0000 | 1.0000 | 97.48 |
| 8.5 | 3,910,908 | 7,102 | 0.0018 | 0.9982 | 97.48 |
| 9.5 | 3,819,666 | 200,000 | 0.0524 | 0.9476 | 97.30 |
| 10.5 | 3,482,721 | | 0.0000 | 1.0000 | 92.21 |
| 11.5 | 3,214,837 | 16,280 | 0.0051 | 0.9949 | 92.21 |
| 12.5 | 1,482,888 | | 0.0000 | 1.0000 | 91.74 |
| 13.5 | 1,482,888 | | 0.0000 | 1.0000 | 91.74 |
| 14.5 | 1,482,888 | | 0.0000 | 1.0000 | 91.74 |
| 15.5 | 1,482,888 | | 0.0000 | 1.0000 | 91.74 |
| 16.5 | 1,359,099 | | 0.0000 | 1.0000 | 91.74 |
| 17.5 | 1,359,099 | | 0.0000 | 1.0000 | 91.74 |
| 18.5 | 1,359,099 | | 0.0000 | 1.0000 | 91.74 |
| 19.5 | 936,582 | | 0.0000 | 1.0000 | 91.74 |
| 20.5 | 854,646 | | 0.0000 | 1.0000 | 91.74 |
| 21.5 | 854,646 | | 0.0000 | 1.0000 | 91.74 |
| 22.5 | 854,646 | 64,494 | 0.0755 | 0.9245 | 91.74 |
| 23.5 | 790,153 | | 0.0000 | 1.0000 | 84.82 |
| 24.5 | 790,153 | | 0.0000 | 1.0000 | 84.82 |
| 25.5 | 790,153 | | 0.0000 | 1.0000 | 84.82 |
| 26.5 | 790,153 | | 0.0000 | 1.0000 | 84.82 |
| 27.5 | 779,116 | 15 | 0.0000 | 1.0000 | 84.82 |
| 28.5 | 681,158 | | 0.0000 | 1.0000 | 84.81 |
| 29.5 | 681,158 | | 0.0000 | 1.0000 | 84.81 |
| 30.5 | 681,158 | | 0.0000 | 1.0000 | 84.81 |
| 31.5 | 615,525 | | 0.0000 | 1.0000 | 84.81 |
| 32.5 | 615,525 | | 0.0000 | 1.0000 | 84.81 |
| 33.5 | 615,525 | | 0.0000 | 1.0000 | 84.81 |
| 34.5 | 615,525 | | 0.0000 | 1.0000 | 84.81 |
| 35.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 36.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 37.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 38.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |

NEWFOUNDLAND AND LABRADOR HYDRO

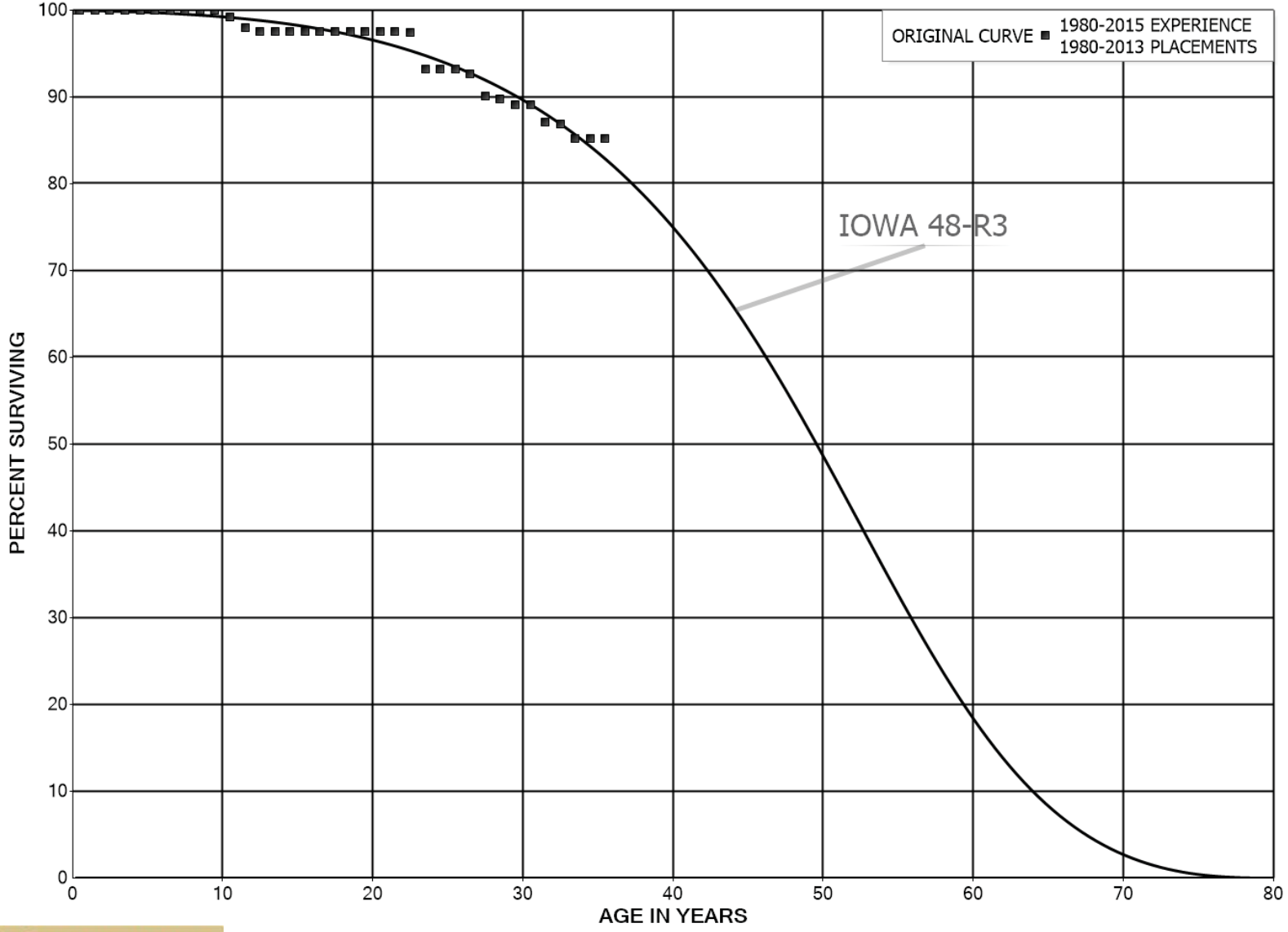
ACCOUNT P12 - PROTECTIVE CONTROL AND RELAY PANELS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 40.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 41.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 42.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 43.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 44.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 45.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 46.5 | 341,524 | | 0.0000 | 1.0000 | 84.81 |
| 47.5 | 284,442 | | 0.0000 | 1.0000 | 84.81 |
| 48.5 | | | | | 84.81 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R01 - RADIO TOWERS (WOOD OR STEEL)
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

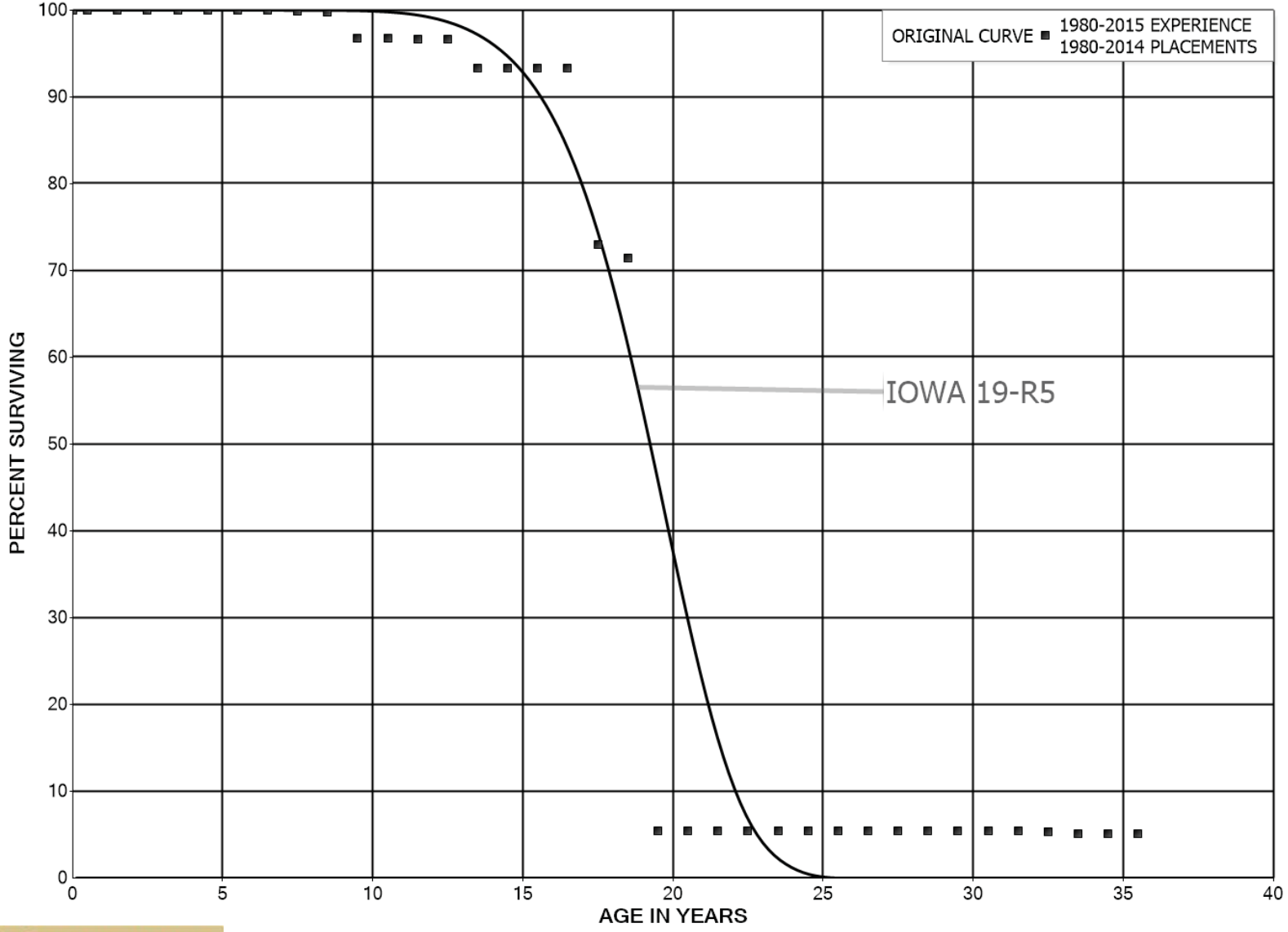
ACCOUNT R01 - RADIO TOWERS (WOOD OR STEEL)

ORIGINAL LIFE TABLE

PLACEMENT BAND 1980-2013 EXPERIENCE BAND 1980-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 10,210,442 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 10,210,442 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 10,210,442 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 9,947,473 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 9,790,093 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 9,790,093 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 9,575,446 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 9,393,802 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 9,393,802 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 9,028,332 | 1,887 | 0.0002 | 0.9998 | 100.00 |
| 9.5 | 9,026,445 | 71,491 | 0.0079 | 0.9921 | 99.98 |
| 10.5 | 8,723,764 | 113,599 | 0.0130 | 0.9870 | 99.19 |
| 11.5 | 8,610,165 | 32,144 | 0.0037 | 0.9963 | 97.90 |
| 12.5 | 4,170,732 | | 0.0000 | 1.0000 | 97.53 |
| 13.5 | 4,170,732 | | 0.0000 | 1.0000 | 97.53 |
| 14.5 | 1,951,585 | | 0.0000 | 1.0000 | 97.53 |
| 15.5 | 1,951,585 | | 0.0000 | 1.0000 | 97.53 |
| 16.5 | 1,951,585 | | 0.0000 | 1.0000 | 97.53 |
| 17.5 | 1,951,585 | | 0.0000 | 1.0000 | 97.53 |
| 18.5 | 1,951,585 | 511 | 0.0003 | 0.9997 | 97.53 |
| 19.5 | 1,951,074 | | 0.0000 | 1.0000 | 97.50 |
| 20.5 | 1,951,074 | | 0.0000 | 1.0000 | 97.50 |
| 21.5 | 1,951,074 | 2,042 | 0.0010 | 0.9990 | 97.50 |
| 22.5 | 1,928,684 | 84,079 | 0.0436 | 0.9564 | 97.40 |
| 23.5 | 1,844,605 | | 0.0000 | 1.0000 | 93.16 |
| 24.5 | 1,844,605 | | 0.0000 | 1.0000 | 93.16 |
| 25.5 | 1,783,733 | 11,183 | 0.0063 | 0.9937 | 93.16 |
| 26.5 | 1,772,550 | 48,007 | 0.0271 | 0.9729 | 92.57 |
| 27.5 | 1,724,543 | 6,445 | 0.0037 | 0.9963 | 90.07 |
| 28.5 | 1,718,098 | 13,493 | 0.0079 | 0.9921 | 89.73 |
| 29.5 | 1,704,605 | | 0.0000 | 1.0000 | 89.02 |
| 30.5 | 1,704,605 | 37,301 | 0.0219 | 0.9781 | 89.02 |
| 31.5 | 1,321,553 | 2,832 | 0.0021 | 0.9979 | 87.08 |
| 32.5 | 1,318,721 | 26,322 | 0.0200 | 0.9800 | 86.89 |
| 33.5 | 1,129,316 | | 0.0000 | 1.0000 | 85.15 |
| 34.5 | 1,129,316 | | 0.0000 | 1.0000 | 85.15 |
| 35.5 | | | | | 85.15 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R02 - RADIOS - FIXED MICROWAVE EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

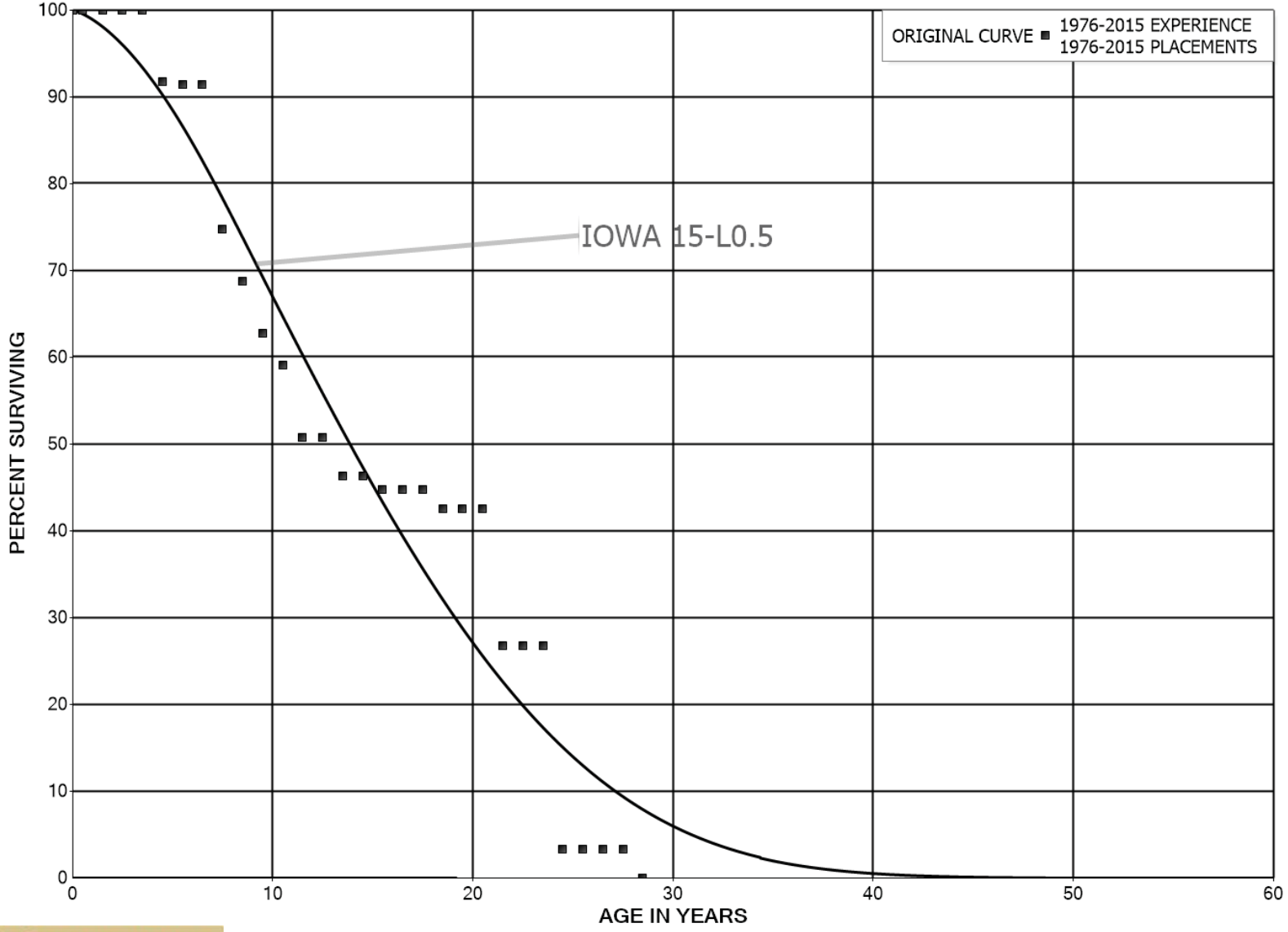
ACCOUNT R02 - RADIOS - FIXED MICROWAVE EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1980-2014 EXPERIENCE BAND 1980-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 9,015,572 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 9,015,572 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 8,079,697 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 8,079,697 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 8,037,253 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 8,037,253 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 7,984,806 | 5,955 | 0.0007 | 0.9993 | 100.00 |
| 6.5 | 7,978,851 | 5,955 | 0.0007 | 0.9993 | 99.93 |
| 7.5 | 7,972,896 | 11,911 | 0.0015 | 0.9985 | 99.85 |
| 8.5 | 7,776,559 | 229,080 | 0.0295 | 0.9705 | 99.70 |
| 9.5 | 7,547,479 | | 0.0000 | 1.0000 | 96.76 |
| 10.5 | 7,547,479 | 8,953 | 0.0012 | 0.9988 | 96.76 |
| 11.5 | 7,538,526 | | 0.0000 | 1.0000 | 96.65 |
| 12.5 | 5,602,065 | 196,602 | 0.0351 | 0.9649 | 96.65 |
| 13.5 | 5,405,463 | | 0.0000 | 1.0000 | 93.26 |
| 14.5 | 2,478,110 | | 0.0000 | 1.0000 | 93.26 |
| 15.5 | 2,478,110 | | 0.0000 | 1.0000 | 93.26 |
| 16.5 | 2,478,110 | 541,022 | 0.2183 | 0.7817 | 93.26 |
| 17.5 | 1,937,088 | 38,530 | 0.0199 | 0.9801 | 72.90 |
| 18.5 | 1,898,558 | 1,755,806 | 0.9248 | 0.0752 | 71.45 |
| 19.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 20.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 21.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 22.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 23.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 24.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 25.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 26.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 27.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 28.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 29.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 30.5 | 142,752 | | 0.0000 | 1.0000 | 5.37 |
| 31.5 | 142,752 | 1,124 | 0.0079 | 0.9921 | 5.37 |
| 32.5 | 141,628 | 7,869 | 0.0556 | 0.9444 | 5.33 |
| 33.5 | 133,759 | | 0.0000 | 1.0000 | 5.03 |
| 34.5 | 133,759 | | 0.0000 | 1.0000 | 5.03 |
| 35.5 | | | | | 5.03 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R03 - RADIOS - FIXED UHF EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

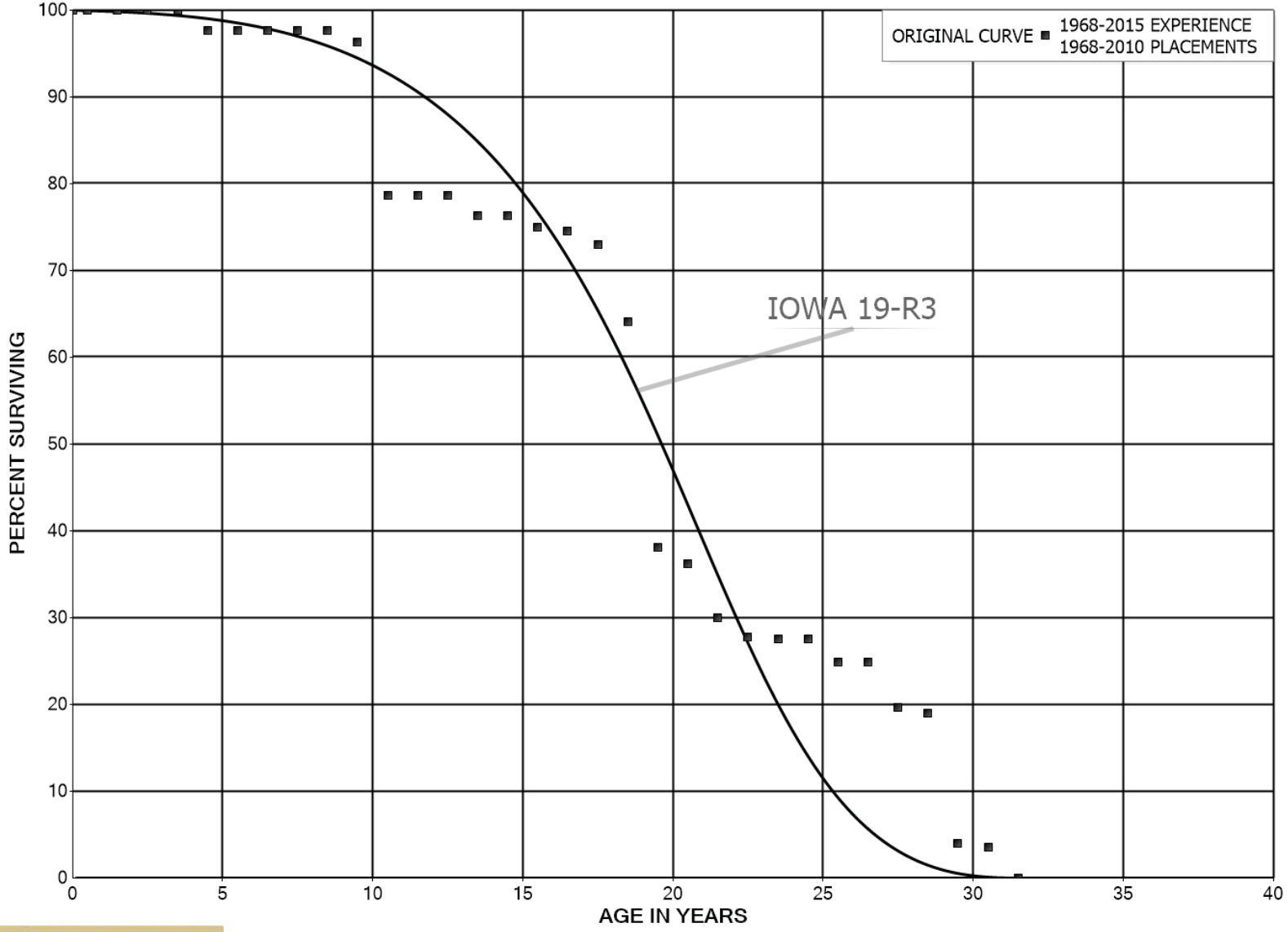
ACCOUNT R03 - RADIOS - FIXED UHF EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1976-2015 EXPERIENCE BAND 1976-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 794,415 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 791,030 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 791,030 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 791,030 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 782,054 | 64,764 | 0.0828 | 0.9172 | 100.00 |
| 4.5 | 717,290 | 2,571 | 0.0036 | 0.9964 | 91.72 |
| 5.5 | 714,718 | | 0.0000 | 1.0000 | 91.39 |
| 6.5 | 664,939 | 120,949 | 0.1819 | 0.8181 | 91.39 |
| 7.5 | 504,468 | 40,640 | 0.0806 | 0.9194 | 74.77 |
| 8.5 | 463,828 | 40,546 | 0.0874 | 0.9126 | 68.74 |
| 9.5 | 423,282 | 24,923 | 0.0589 | 0.9411 | 62.73 |
| 10.5 | 398,359 | 56,185 | 0.1410 | 0.8590 | 59.04 |
| 11.5 | 342,174 | | 0.0000 | 1.0000 | 50.71 |
| 12.5 | 342,174 | 30,009 | 0.0877 | 0.9123 | 50.71 |
| 13.5 | 312,165 | | 0.0000 | 1.0000 | 46.27 |
| 14.5 | 312,165 | 10,053 | 0.0322 | 0.9678 | 46.27 |
| 15.5 | 302,112 | | 0.0000 | 1.0000 | 44.78 |
| 16.5 | 302,112 | | 0.0000 | 1.0000 | 44.78 |
| 17.5 | 302,112 | 14,969 | 0.0495 | 0.9505 | 44.78 |
| 18.5 | 287,143 | | 0.0000 | 1.0000 | 42.56 |
| 19.5 | 287,143 | | 0.0000 | 1.0000 | 42.56 |
| 20.5 | 287,143 | 107,012 | 0.3727 | 0.6273 | 42.56 |
| 21.5 | 180,132 | | 0.0000 | 1.0000 | 26.70 |
| 22.5 | 180,132 | | 0.0000 | 1.0000 | 26.70 |
| 23.5 | 180,132 | 157,782 | 0.8759 | 0.1241 | 26.70 |
| 24.5 | 22,350 | | 0.0000 | 1.0000 | 3.31 |
| 25.5 | 22,350 | | 0.0000 | 1.0000 | 3.31 |
| 26.5 | 22,350 | | 0.0000 | 1.0000 | 3.31 |
| 27.5 | 22,350 | 22,350 | 1.0000 | | 3.31 |
| 28.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R04 - RADIOS - FIXED VHF EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

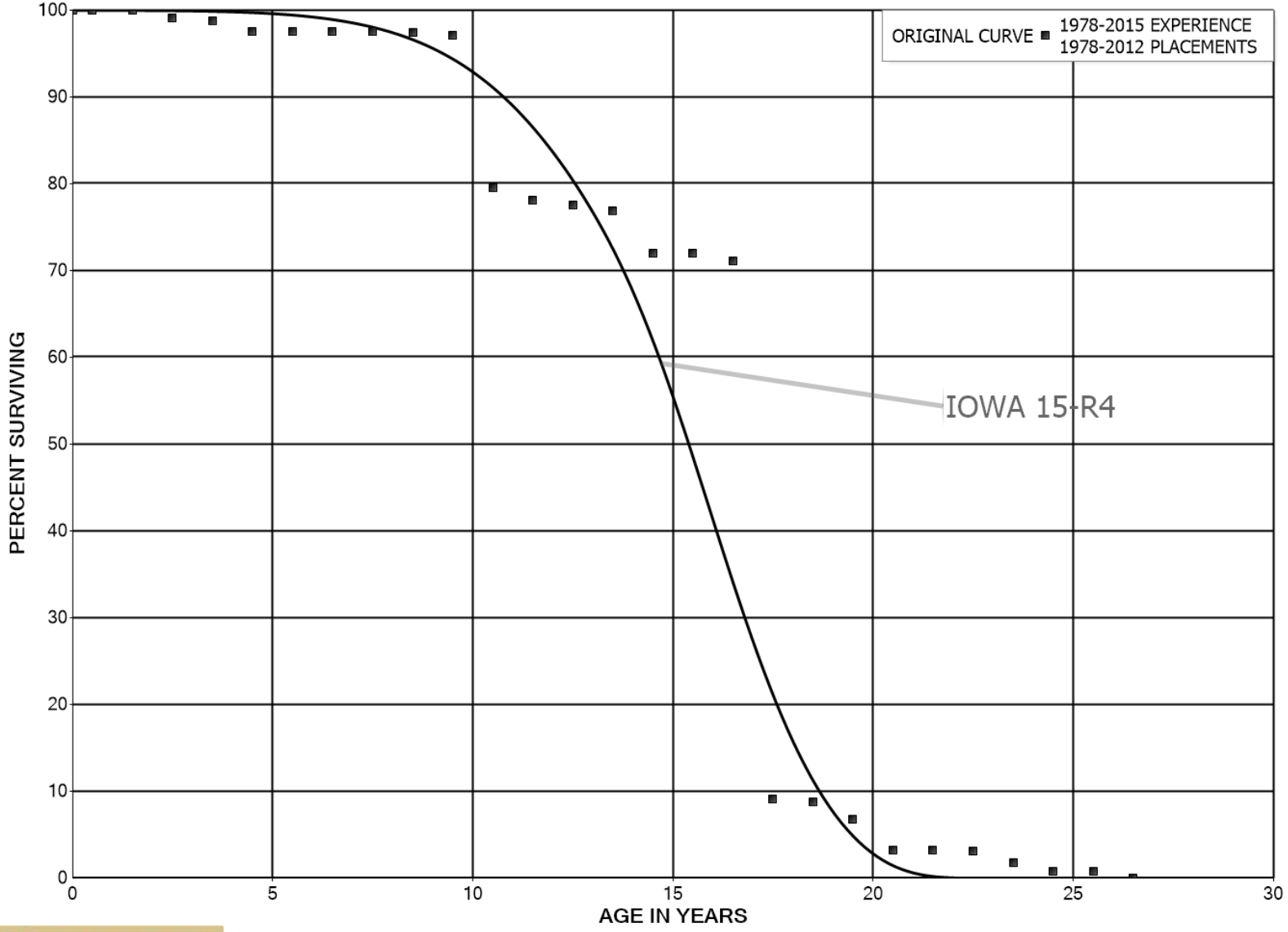
ACCOUNT R04 - RADIOS - FIXED VHF EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2010 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 4,446,342 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 4,446,342 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 4,446,342 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 4,446,342 | 2,815 | 0.0006 | 0.9994 | 100.00 |
| 3.5 | 4,443,527 | 100,821 | 0.0227 | 0.9773 | 99.94 |
| 4.5 | 4,342,706 | | 0.0000 | 1.0000 | 97.67 |
| 5.5 | 4,274,065 | | 0.0000 | 1.0000 | 97.67 |
| 6.5 | 4,274,065 | | 0.0000 | 1.0000 | 97.67 |
| 7.5 | 4,274,065 | | 0.0000 | 1.0000 | 97.67 |
| 8.5 | 4,274,065 | 58,697 | 0.0137 | 0.9863 | 97.67 |
| 9.5 | 4,004,327 | 734,453 | 0.1834 | 0.8166 | 96.33 |
| 10.5 | 3,269,873 | 4,032 | 0.0012 | 0.9988 | 78.66 |
| 11.5 | 3,265,282 | | 0.0000 | 1.0000 | 78.56 |
| 12.5 | 3,147,036 | 91,387 | 0.0290 | 0.9710 | 78.56 |
| 13.5 | 3,055,649 | | 0.0000 | 1.0000 | 76.28 |
| 14.5 | 3,055,649 | 55,707 | 0.0182 | 0.9818 | 76.28 |
| 15.5 | 2,999,943 | 13,726 | 0.0046 | 0.9954 | 74.89 |
| 16.5 | 2,986,216 | 65,444 | 0.0219 | 0.9781 | 74.55 |
| 17.5 | 2,920,772 | 356,547 | 0.1221 | 0.8779 | 72.91 |
| 18.5 | 2,564,225 | 1,039,595 | 0.4054 | 0.5946 | 64.01 |
| 19.5 | 1,524,630 | 74,301 | 0.0487 | 0.9513 | 38.06 |
| 20.5 | 1,450,329 | 249,527 | 0.1720 | 0.8280 | 36.21 |
| 21.5 | 1,200,802 | 90,709 | 0.0755 | 0.9245 | 29.98 |
| 22.5 | 1,110,094 | 6,486 | 0.0058 | 0.9942 | 27.71 |
| 23.5 | 941,929 | 2,316 | 0.0025 | 0.9975 | 27.55 |
| 24.5 | 939,613 | 90,645 | 0.0965 | 0.9035 | 27.48 |
| 25.5 | 848,968 | | 0.0000 | 1.0000 | 24.83 |
| 26.5 | 848,968 | 179,152 | 0.2110 | 0.7890 | 24.83 |
| 27.5 | 669,816 | 21,779 | 0.0325 | 0.9675 | 19.59 |
| 28.5 | 648,037 | 513,070 | 0.7917 | 0.2083 | 18.95 |
| 29.5 | 134,966 | 14,179 | 0.1051 | 0.8949 | 3.95 |
| 30.5 | 120,787 | 120,787 | 1.0000 | | 3.53 |
| 31.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R05 - RADIOS - MOBILE VHF BASE STATION
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

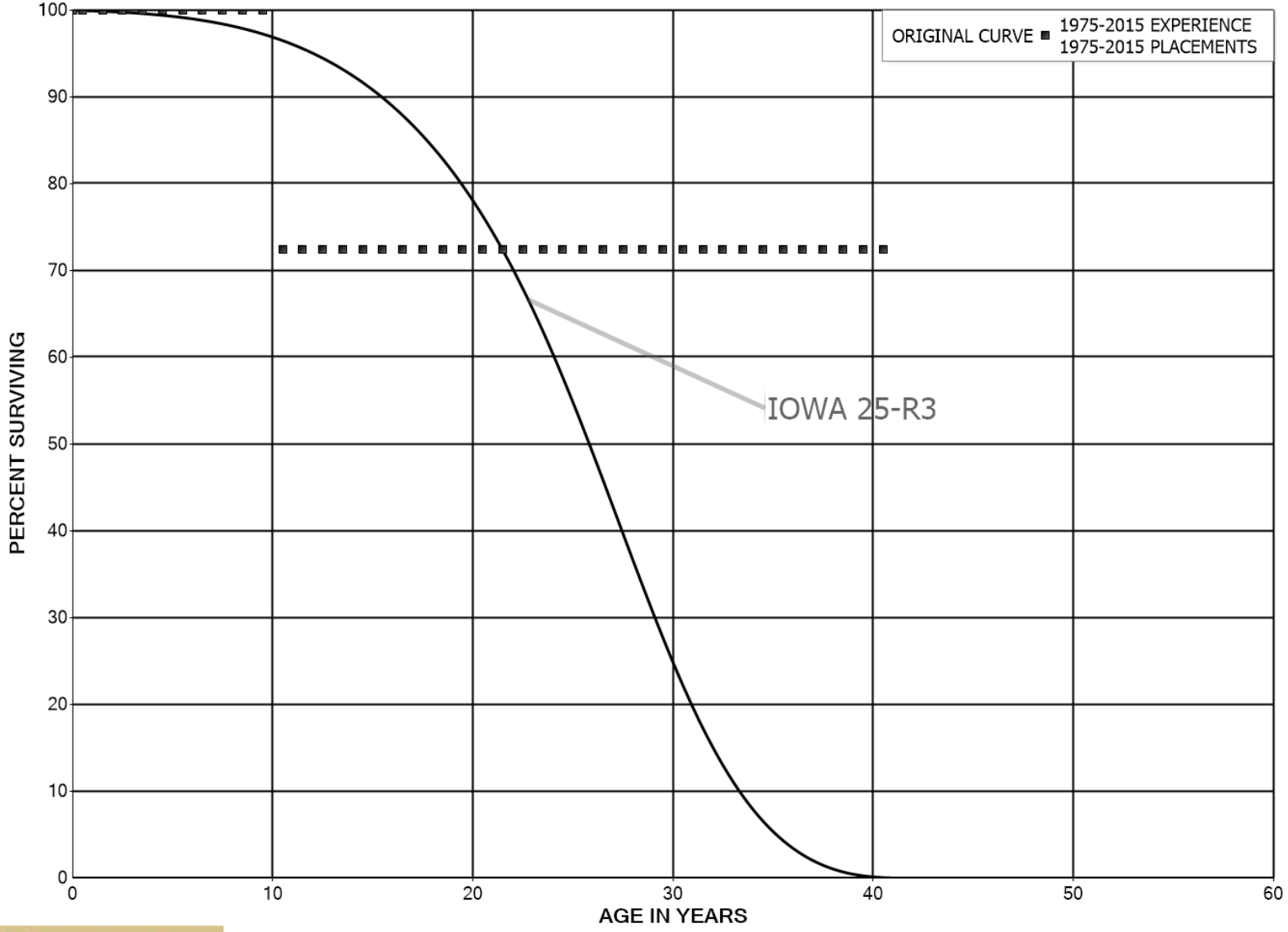
ACCOUNT R05 - RADIOS - MOBILE VHF BASE STATION

ORIGINAL LIFE TABLE

PLACEMENT BAND 1978-2012 EXPERIENCE BAND 1978-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 9,104,030 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 9,104,030 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 9,104,030 | 82,942 | 0.0091 | 0.9909 | 100.00 |
| 2.5 | 9,021,088 | 37,902 | 0.0042 | 0.9958 | 99.09 |
| 3.5 | 8,268,047 | 93,309 | 0.0113 | 0.9887 | 98.67 |
| 4.5 | 8,172,088 | | 0.0000 | 1.0000 | 97.56 |
| 5.5 | 7,818,683 | 6,366 | 0.0008 | 0.9992 | 97.56 |
| 6.5 | 7,812,317 | | 0.0000 | 1.0000 | 97.48 |
| 7.5 | 7,812,317 | 10,505 | 0.0013 | 0.9987 | 97.48 |
| 8.5 | 7,352,576 | 20,805 | 0.0028 | 0.9972 | 97.35 |
| 9.5 | 1,761,018 | 319,279 | 0.1813 | 0.8187 | 97.07 |
| 10.5 | 1,441,739 | 25,352 | 0.0176 | 0.9824 | 79.47 |
| 11.5 | 1,413,587 | 10,295 | 0.0073 | 0.9927 | 78.08 |
| 12.5 | 1,261,094 | 11,659 | 0.0092 | 0.9908 | 77.51 |
| 13.5 | 1,249,436 | 78,884 | 0.0631 | 0.9369 | 76.79 |
| 14.5 | 1,170,552 | 733 | 0.0006 | 0.9994 | 71.94 |
| 15.5 | 1,156,464 | 13,556 | 0.0117 | 0.9883 | 71.90 |
| 16.5 | 1,116,944 | 973,911 | 0.8719 | 0.1281 | 71.05 |
| 17.5 | 143,032 | 5,250 | 0.0367 | 0.9633 | 9.10 |
| 18.5 | 137,783 | 31,710 | 0.2301 | 0.7699 | 8.77 |
| 19.5 | 106,073 | 56,883 | 0.5363 | 0.4637 | 6.75 |
| 20.5 | 49,190 | | 0.0000 | 1.0000 | 3.13 |
| 21.5 | 49,190 | 1,871 | 0.0380 | 0.9620 | 3.13 |
| 22.5 | 47,319 | 19,561 | 0.4134 | 0.5866 | 3.01 |
| 23.5 | 27,758 | 16,061 | 0.5786 | 0.4214 | 1.77 |
| 24.5 | 11,698 | | 0.0000 | 1.0000 | 0.74 |
| 25.5 | 8,536 | 8,536 | 1.0000 | | 0.74 |
| 26.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R06 - RAMPS - YARD STORAGE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

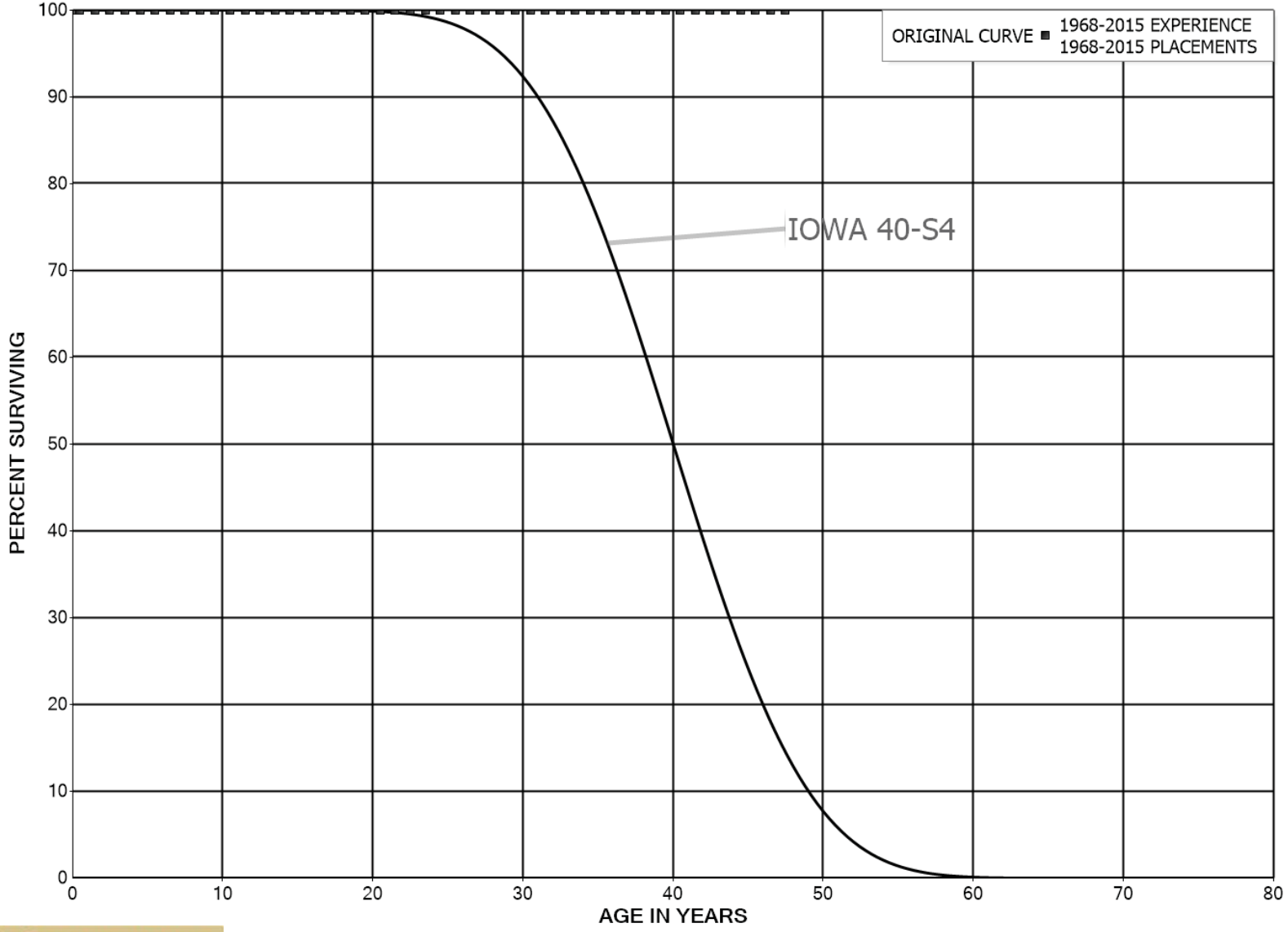
ACCOUNT R06 - RAMPS - YARD STORAGE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1975-2015 EXPERIENCE BAND 1975-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 1,827,330 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 1,695,776 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 1,664,996 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 1,664,996 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,664,996 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 1,664,996 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 1,470,416 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 1,195,179 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 1,066,911 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 1,004,386 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 847,069 | 233,772 | 0.2760 | 0.7240 | 100.00 |
| 10.5 | 575,925 | | 0.0000 | 1.0000 | 72.40 |
| 11.5 | 575,925 | | 0.0000 | 1.0000 | 72.40 |
| 12.5 | 575,925 | | 0.0000 | 1.0000 | 72.40 |
| 13.5 | 575,925 | | 0.0000 | 1.0000 | 72.40 |
| 14.5 | 521,151 | | 0.0000 | 1.0000 | 72.40 |
| 15.5 | 521,151 | | 0.0000 | 1.0000 | 72.40 |
| 16.5 | 429,890 | | 0.0000 | 1.0000 | 72.40 |
| 17.5 | 429,890 | | 0.0000 | 1.0000 | 72.40 |
| 18.5 | 429,890 | | 0.0000 | 1.0000 | 72.40 |
| 19.5 | 379,924 | | 0.0000 | 1.0000 | 72.40 |
| 20.5 | 379,924 | | 0.0000 | 1.0000 | 72.40 |
| 21.5 | 379,924 | | 0.0000 | 1.0000 | 72.40 |
| 22.5 | 330,462 | | 0.0000 | 1.0000 | 72.40 |
| 23.5 | 318,978 | | 0.0000 | 1.0000 | 72.40 |
| 24.5 | 300,868 | | 0.0000 | 1.0000 | 72.40 |
| 25.5 | 220,787 | | 0.0000 | 1.0000 | 72.40 |
| 26.5 | 114,938 | | 0.0000 | 1.0000 | 72.40 |
| 27.5 | 114,938 | | 0.0000 | 1.0000 | 72.40 |
| 28.5 | 82,374 | | 0.0000 | 1.0000 | 72.40 |
| 29.5 | 82,374 | | 0.0000 | 1.0000 | 72.40 |
| 30.5 | 82,374 | | 0.0000 | 1.0000 | 72.40 |
| 31.5 | 82,374 | | 0.0000 | 1.0000 | 72.40 |
| 32.5 | 82,374 | | 0.0000 | 1.0000 | 72.40 |
| 33.5 | 65,163 | | 0.0000 | 1.0000 | 72.40 |
| 34.5 | 65,163 | | 0.0000 | 1.0000 | 72.40 |
| 35.5 | 65,163 | | 0.0000 | 1.0000 | 72.40 |
| 36.5 | 23,740 | | 0.0000 | 1.0000 | 72.40 |
| 37.5 | 23,740 | | 0.0000 | 1.0000 | 72.40 |
| 38.5 | 23,740 | | 0.0000 | 1.0000 | 72.40 |
| 39.5 | 23,740 | | 0.0000 | 1.0000 | 72.40 |
| 40.5 | | | | | 72.40 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R07 - REACTORS AND RESISTORS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R07 - REACTORS AND RESISTORS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 1,225,065 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 1,150,230 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 1,044,650 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 1,044,650 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,024,903 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 1,024,903 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 1,024,903 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 1,024,903 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 1,024,903 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 1,024,903 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 1,009,016 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 1,009,016 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 1,009,016 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 1,009,016 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 1,009,016 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 1,009,016 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 807,059 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 807,059 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 807,059 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 807,059 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 776,038 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 69,855 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 58,523 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 58,523 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 58,523 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 50,523 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | 20,083 | | 0.0000 | 1.0000 | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

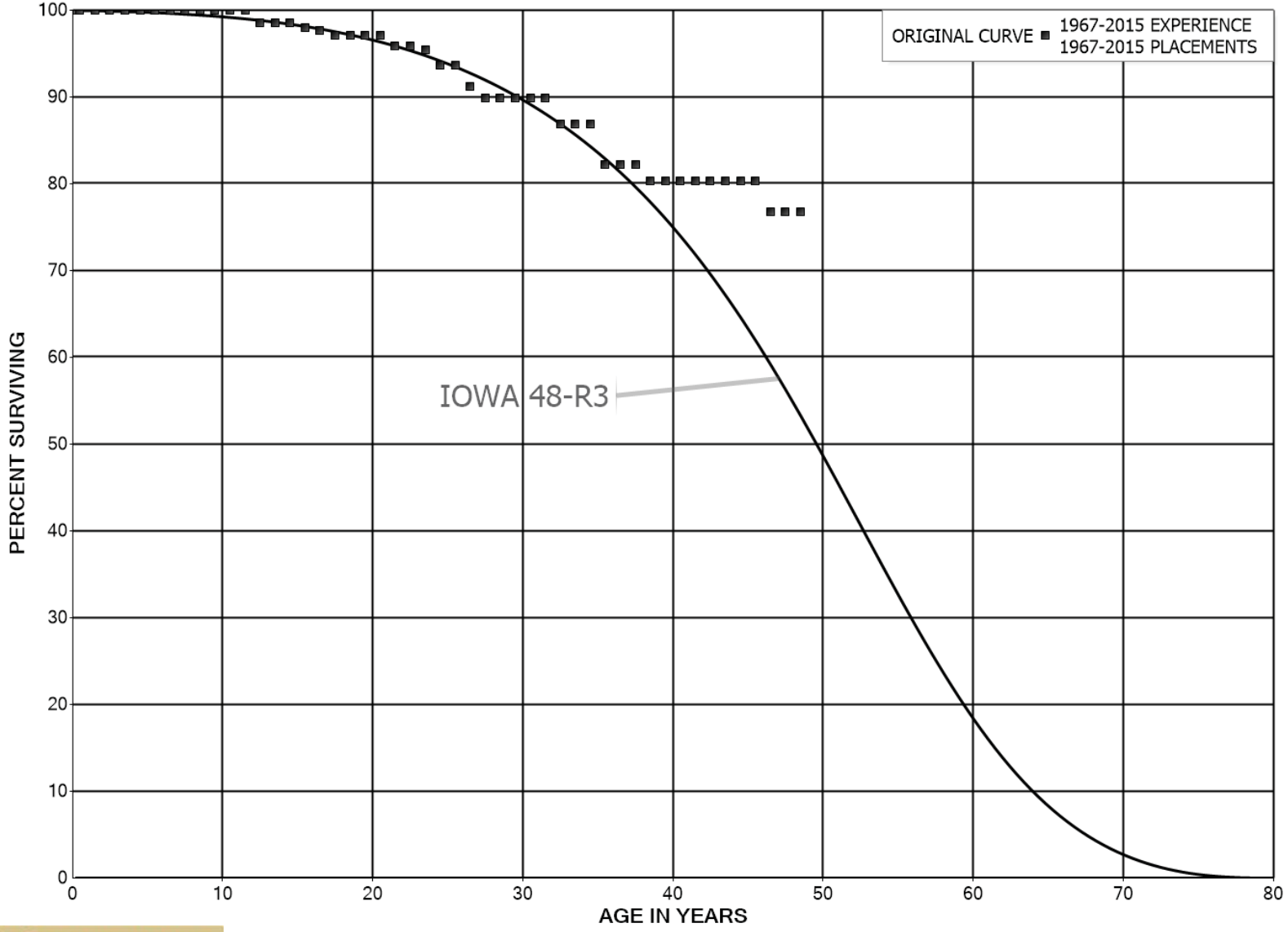
ACCOUNT R07 - REACTORS AND RESISTORS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 20,083 | | 0.0000 | 1.0000 | 100.00 |
| 40.5 | 20,083 | | 0.0000 | 1.0000 | 100.00 |
| 41.5 | 20,083 | | 0.0000 | 1.0000 | 100.00 |
| 42.5 | 20,083 | | 0.0000 | 1.0000 | 100.00 |
| 43.5 | 20,083 | | 0.0000 | 1.0000 | 100.00 |
| 44.5 | 20,083 | | 0.0000 | 1.0000 | 100.00 |
| 45.5 | 20,083 | | 0.0000 | 1.0000 | 100.00 |
| 46.5 | 20,083 | | 0.0000 | 1.0000 | 100.00 |
| 47.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R08 - RECLOSERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R08 - RECLOSERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 7,507,617 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 6,949,014 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 6,662,682 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 5,895,099 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 5,108,664 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 4,814,440 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 4,354,278 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 4,163,117 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 4,006,122 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 4,006,122 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 3,961,448 | 0 | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 3,776,745 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 3,769,335 | 54,532 | 0.0145 | 0.9855 | 100.00 |
| 12.5 | 3,471,248 | | 0.0000 | 1.0000 | 98.55 |
| 13.5 | 3,435,200 | | 0.0000 | 1.0000 | 98.55 |
| 14.5 | 3,360,707 | 21,116 | 0.0063 | 0.9937 | 98.55 |
| 15.5 | 3,214,479 | 11,904 | 0.0037 | 0.9963 | 97.93 |
| 16.5 | 3,174,022 | 16,452 | 0.0052 | 0.9948 | 97.57 |
| 17.5 | 2,931,930 | | 0.0000 | 1.0000 | 97.07 |
| 18.5 | 2,779,686 | | 0.0000 | 1.0000 | 97.07 |
| 19.5 | 2,732,873 | | 0.0000 | 1.0000 | 97.07 |
| 20.5 | 2,654,108 | 34,715 | 0.0131 | 0.9869 | 97.07 |
| 21.5 | 2,311,277 | | 0.0000 | 1.0000 | 95.80 |
| 22.5 | 2,268,542 | 10,513 | 0.0046 | 0.9954 | 95.80 |
| 23.5 | 2,189,545 | 40,426 | 0.0185 | 0.9815 | 95.35 |
| 24.5 | 2,095,649 | | 0.0000 | 1.0000 | 93.59 |
| 25.5 | 1,926,765 | 50,160 | 0.0260 | 0.9740 | 93.59 |
| 26.5 | 1,795,981 | 26,171 | 0.0146 | 0.9854 | 91.16 |
| 27.5 | 1,577,364 | | 0.0000 | 1.0000 | 89.83 |
| 28.5 | 1,457,161 | | 0.0000 | 1.0000 | 89.83 |
| 29.5 | 1,446,674 | | 0.0000 | 1.0000 | 89.83 |
| 30.5 | 1,298,556 | | 0.0000 | 1.0000 | 89.83 |
| 31.5 | 1,102,647 | 37,181 | 0.0337 | 0.9663 | 89.83 |
| 32.5 | 1,051,786 | | 0.0000 | 1.0000 | 86.80 |
| 33.5 | 841,501 | | 0.0000 | 1.0000 | 86.80 |
| 34.5 | 593,657 | 31,275 | 0.0527 | 0.9473 | 86.80 |
| 35.5 | 562,383 | | 0.0000 | 1.0000 | 82.23 |
| 36.5 | 548,383 | | 0.0000 | 1.0000 | 82.23 |
| 37.5 | 496,996 | 11,624 | 0.0234 | 0.9766 | 82.23 |
| 38.5 | 485,373 | | 0.0000 | 1.0000 | 80.30 |

NEWFOUNDLAND AND LABRADOR HYDRO

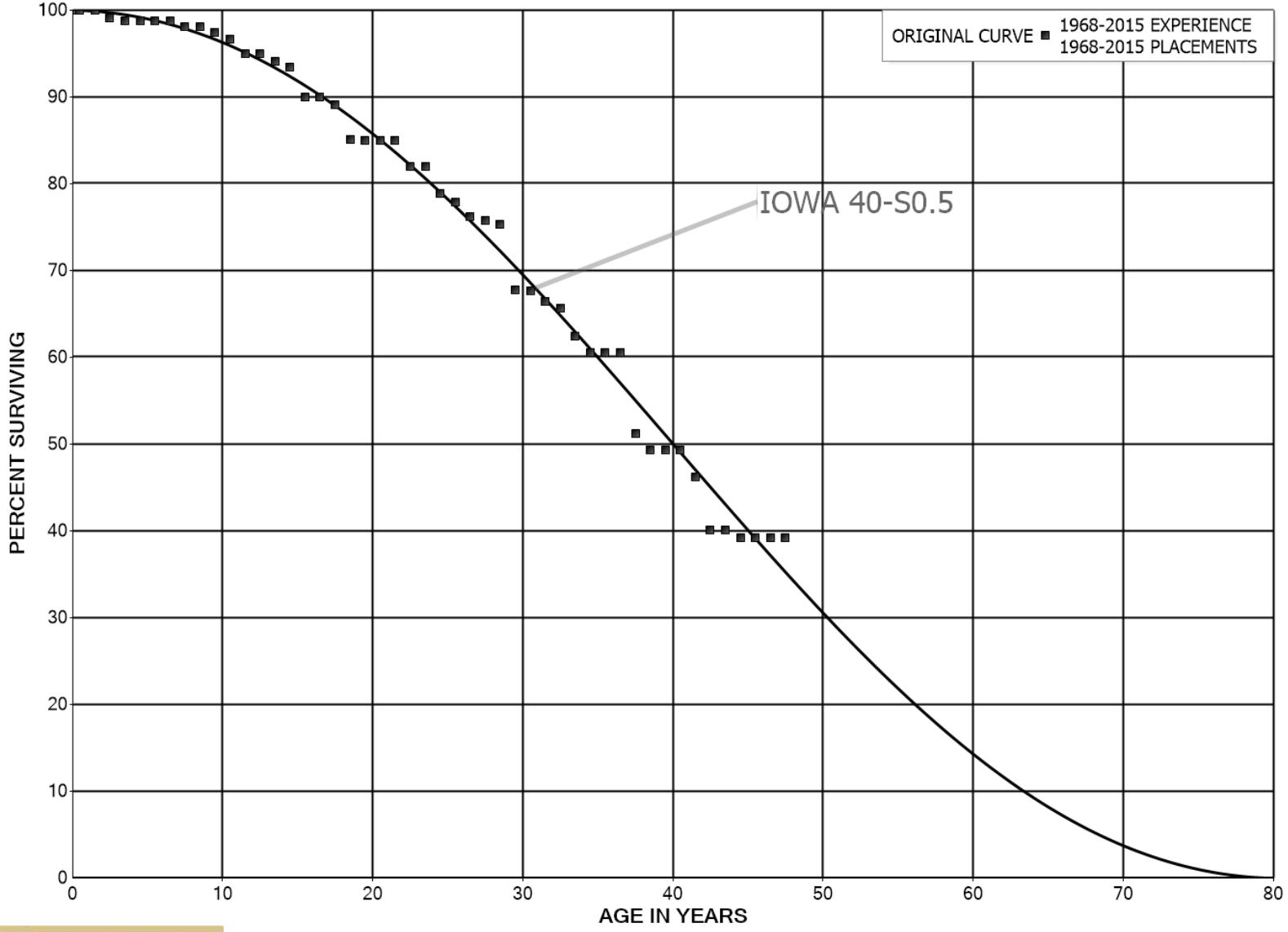
ACCOUNT R08 - RECLOSERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 472,069 | | 0.0000 | 1.0000 | 80.30 |
| 40.5 | 217,567 | | 0.0000 | 1.0000 | 80.30 |
| 41.5 | 217,567 | | 0.0000 | 1.0000 | 80.30 |
| 42.5 | 217,567 | | 0.0000 | 1.0000 | 80.30 |
| 43.5 | 217,567 | | 0.0000 | 1.0000 | 80.30 |
| 44.5 | 194,087 | | 0.0000 | 1.0000 | 80.30 |
| 45.5 | 66,147 | 2,943 | 0.0445 | 0.9555 | 80.30 |
| 46.5 | 63,204 | | 0.0000 | 1.0000 | 76.73 |
| 47.5 | 6,652 | | 0.0000 | 1.0000 | 76.73 |
| 48.5 | | | | | 76.73 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R09 - REGULATORS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R09 - REGULATORS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 7,317,428 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 7,195,261 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 7,036,686 | 62,379 | 0.0089 | 0.9911 | 100.00 |
| 2.5 | 6,437,137 | 23,079 | 0.0036 | 0.9964 | 99.11 |
| 3.5 | 5,797,385 | | 0.0000 | 1.0000 | 98.76 |
| 4.5 | 5,454,934 | | 0.0000 | 1.0000 | 98.76 |
| 5.5 | 5,137,229 | | 0.0000 | 1.0000 | 98.76 |
| 6.5 | 4,734,361 | 31,826 | 0.0067 | 0.9933 | 98.76 |
| 7.5 | 4,459,382 | | 0.0000 | 1.0000 | 98.09 |
| 8.5 | 4,387,654 | 33,037 | 0.0075 | 0.9925 | 98.09 |
| 9.5 | 4,264,904 | 32,602 | 0.0076 | 0.9924 | 97.36 |
| 10.5 | 4,195,732 | 74,216 | 0.0177 | 0.9823 | 96.61 |
| 11.5 | 3,999,184 | | 0.0000 | 1.0000 | 94.90 |
| 12.5 | 3,848,301 | 35,132 | 0.0091 | 0.9909 | 94.90 |
| 13.5 | 3,786,478 | 26,996 | 0.0071 | 0.9929 | 94.04 |
| 14.5 | 3,754,164 | 135,900 | 0.0362 | 0.9638 | 93.37 |
| 15.5 | 3,599,347 | | 0.0000 | 1.0000 | 89.99 |
| 16.5 | 3,599,347 | 36,932 | 0.0103 | 0.9897 | 89.99 |
| 17.5 | 3,562,415 | 159,232 | 0.0447 | 0.9553 | 89.06 |
| 18.5 | 3,299,274 | 6,206 | 0.0019 | 0.9981 | 85.08 |
| 19.5 | 3,293,068 | | 0.0000 | 1.0000 | 84.92 |
| 20.5 | 3,227,427 | | 0.0000 | 1.0000 | 84.92 |
| 21.5 | 3,203,096 | 110,541 | 0.0345 | 0.9655 | 84.92 |
| 22.5 | 2,994,693 | | 0.0000 | 1.0000 | 81.99 |
| 23.5 | 2,994,693 | 114,403 | 0.0382 | 0.9618 | 81.99 |
| 24.5 | 2,880,290 | 37,794 | 0.0131 | 0.9869 | 78.86 |
| 25.5 | 2,721,560 | 59,487 | 0.0219 | 0.9781 | 77.82 |
| 26.5 | 2,659,228 | 13,342 | 0.0050 | 0.9950 | 76.12 |
| 27.5 | 2,544,001 | 16,301 | 0.0064 | 0.9936 | 75.74 |
| 28.5 | 2,431,494 | 241,814 | 0.0995 | 0.9005 | 75.26 |
| 29.5 | 2,189,679 | 6,206 | 0.0028 | 0.9972 | 67.77 |
| 30.5 | 1,955,130 | 35,576 | 0.0182 | 0.9818 | 67.58 |
| 31.5 | 1,853,715 | 19,163 | 0.0103 | 0.9897 | 66.35 |
| 32.5 | 1,798,115 | 88,684 | 0.0493 | 0.9507 | 65.66 |
| 33.5 | 1,614,517 | 48,276 | 0.0299 | 0.9701 | 62.43 |
| 34.5 | 1,451,262 | | 0.0000 | 1.0000 | 60.56 |
| 35.5 | 727,891 | | 0.0000 | 1.0000 | 60.56 |
| 36.5 | 727,891 | 112,698 | 0.1548 | 0.8452 | 60.56 |
| 37.5 | 615,193 | 22,659 | 0.0368 | 0.9632 | 51.18 |
| 38.5 | 555,281 | | 0.0000 | 1.0000 | 49.30 |

NEWFOUNDLAND AND LABRADOR HYDRO

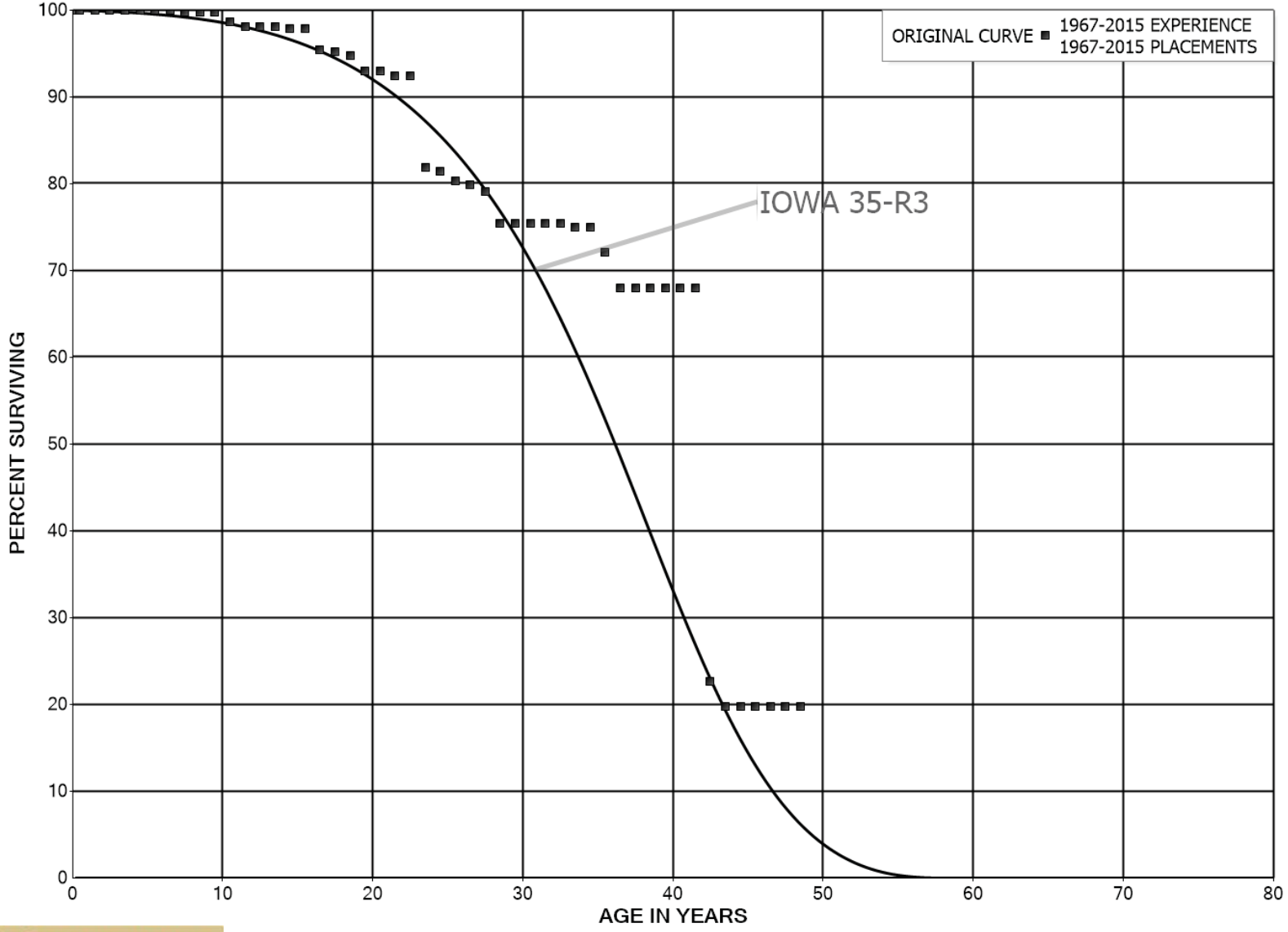
ACCOUNT R09 - REGULATORS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 555,281 | | 0.0000 | 1.0000 | 49.30 |
| 40.5 | 319,070 | 19,871 | 0.0623 | 0.9377 | 49.30 |
| 41.5 | 299,199 | 40,203 | 0.1344 | 0.8656 | 46.23 |
| 42.5 | 258,996 | | 0.0000 | 1.0000 | 40.02 |
| 43.5 | 258,996 | 5,232 | 0.0202 | 0.9798 | 40.02 |
| 44.5 | 73,033 | | 0.0000 | 1.0000 | 39.21 |
| 45.5 | 18,866 | | 0.0000 | 1.0000 | 39.21 |
| 46.5 | 18,866 | | 0.0000 | 1.0000 | 39.21 |
| 47.5 | | | | | 39.21 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R11 - REVENUE METERING
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R11 - REVENUE METERING

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 1,508,564 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 1,225,032 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 1,137,869 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 1,137,869 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,110,539 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 1,110,539 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 1,110,539 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 1,020,842 | 2,849 | 0.0028 | 0.9972 | 100.00 |
| 7.5 | 1,017,993 | | 0.0000 | 1.0000 | 99.72 |
| 8.5 | 1,017,993 | | 0.0000 | 1.0000 | 99.72 |
| 9.5 | 1,017,993 | 11,675 | 0.0115 | 0.9885 | 99.72 |
| 10.5 | 1,006,318 | 5,741 | 0.0057 | 0.9943 | 98.58 |
| 11.5 | 1,000,577 | | 0.0000 | 1.0000 | 98.01 |
| 12.5 | 961,003 | | 0.0000 | 1.0000 | 98.01 |
| 13.5 | 874,366 | 1,423 | 0.0016 | 0.9984 | 98.01 |
| 14.5 | 751,458 | | 0.0000 | 1.0000 | 97.86 |
| 15.5 | 751,458 | 18,546 | 0.0247 | 0.9753 | 97.86 |
| 16.5 | 732,912 | 2,216 | 0.0030 | 0.9970 | 95.44 |
| 17.5 | 730,695 | 3,414 | 0.0047 | 0.9953 | 95.15 |
| 18.5 | 717,902 | 12,997 | 0.0181 | 0.9819 | 94.71 |
| 19.5 | 675,441 | | 0.0000 | 1.0000 | 92.99 |
| 20.5 | 667,906 | 4,262 | 0.0064 | 0.9936 | 92.99 |
| 21.5 | 658,159 | | 0.0000 | 1.0000 | 92.40 |
| 22.5 | 658,159 | 75,135 | 0.1142 | 0.8858 | 92.40 |
| 23.5 | 548,693 | 3,113 | 0.0057 | 0.9943 | 81.85 |
| 24.5 | 529,063 | 7,155 | 0.0135 | 0.9865 | 81.39 |
| 25.5 | 506,277 | 3,057 | 0.0060 | 0.9940 | 80.29 |
| 26.5 | 479,375 | 4,300 | 0.0090 | 0.9910 | 79.80 |
| 27.5 | 443,227 | 20,791 | 0.0469 | 0.9531 | 79.09 |
| 28.5 | 388,109 | | 0.0000 | 1.0000 | 75.38 |
| 29.5 | 344,832 | | 0.0000 | 1.0000 | 75.38 |
| 30.5 | 330,328 | | 0.0000 | 1.0000 | 75.38 |
| 31.5 | 300,515 | | 0.0000 | 1.0000 | 75.38 |
| 32.5 | 267,391 | 1,500 | 0.0056 | 0.9944 | 75.38 |
| 33.5 | 263,370 | 81 | 0.0003 | 0.9997 | 74.95 |
| 34.5 | 230,673 | 8,900 | 0.0386 | 0.9614 | 74.93 |
| 35.5 | 184,070 | 10,380 | 0.0564 | 0.9436 | 72.04 |
| 36.5 | 165,782 | | 0.0000 | 1.0000 | 67.98 |
| 37.5 | 127,806 | | 0.0000 | 1.0000 | 67.98 |
| 38.5 | 119,068 | | 0.0000 | 1.0000 | 67.98 |

NEWFOUNDLAND AND LABRADOR HYDRO

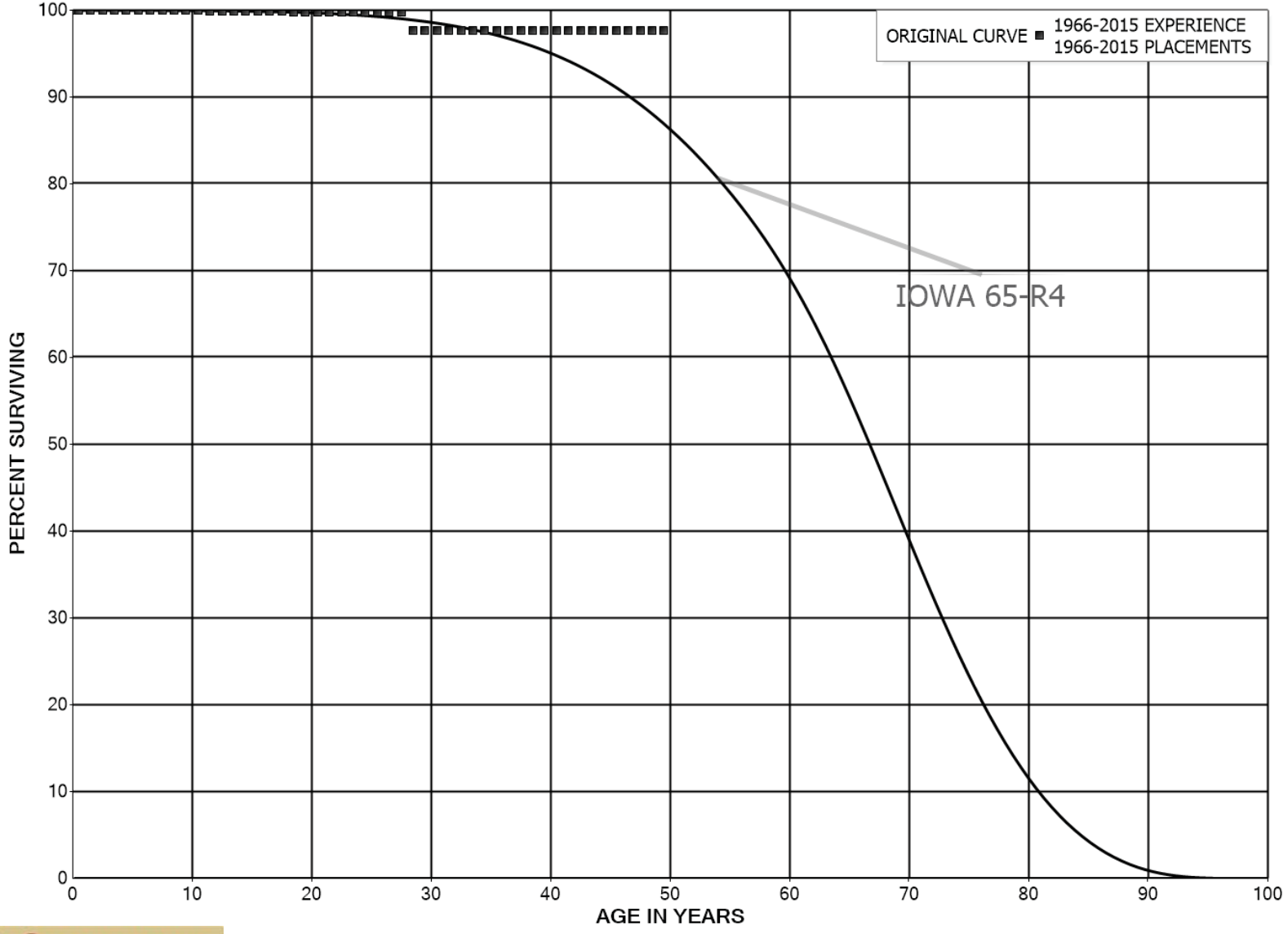
ACCOUNT R11 - REVENUE METERING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 109,085 | | 0.0000 | 1.0000 | 67.98 |
| 40.5 | 109,085 | | 0.0000 | 1.0000 | 67.98 |
| 41.5 | 95,985 | 64,116 | 0.6680 | 0.3320 | 67.98 |
| 42.5 | 31,869 | 3,996 | 0.1254 | 0.8746 | 22.57 |
| 43.5 | 27,873 | | 0.0000 | 1.0000 | 19.74 |
| 44.5 | 27,873 | | 0.0000 | 1.0000 | 19.74 |
| 45.5 | 19,571 | | 0.0000 | 1.0000 | 19.74 |
| 46.5 | 19,571 | | 0.0000 | 1.0000 | 19.74 |
| 47.5 | 12,751 | | 0.0000 | 1.0000 | 19.74 |
| 48.5 | | | | | 19.74 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R12 - RIGHT-OF-WAYS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R12 - RIGHT-OF-WAYS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 22,059,531 | 1,600 | 0.0001 | 0.9999 | 100.00 |
| 0.5 | 21,605,210 | | 0.0000 | 1.0000 | 99.99 |
| 1.5 | 21,293,543 | | 0.0000 | 1.0000 | 99.99 |
| 2.5 | 20,849,493 | | 0.0000 | 1.0000 | 99.99 |
| 3.5 | 20,504,169 | | 0.0000 | 1.0000 | 99.99 |
| 4.5 | 20,490,290 | | 0.0000 | 1.0000 | 99.99 |
| 5.5 | 20,392,646 | | 0.0000 | 1.0000 | 99.99 |
| 6.5 | 20,226,290 | 11,091 | 0.0005 | 0.9995 | 99.99 |
| 7.5 | 20,065,833 | | 0.0000 | 1.0000 | 99.94 |
| 8.5 | 19,966,375 | | 0.0000 | 1.0000 | 99.94 |
| 9.5 | 18,837,838 | | 0.0000 | 1.0000 | 99.94 |
| 10.5 | 18,709,150 | 15,824 | 0.0008 | 0.9992 | 99.94 |
| 11.5 | 18,614,027 | | 0.0000 | 1.0000 | 99.85 |
| 12.5 | 18,581,320 | | 0.0000 | 1.0000 | 99.85 |
| 13.5 | 17,152,270 | | 0.0000 | 1.0000 | 99.85 |
| 14.5 | 17,141,738 | | 0.0000 | 1.0000 | 99.85 |
| 15.5 | 17,126,720 | | 0.0000 | 1.0000 | 99.85 |
| 16.5 | 17,022,978 | | 0.0000 | 1.0000 | 99.85 |
| 17.5 | 16,432,628 | 14,319 | 0.0009 | 0.9991 | 99.85 |
| 18.5 | 16,235,393 | | 0.0000 | 1.0000 | 99.77 |
| 19.5 | 15,703,747 | 1,048 | 0.0001 | 0.9999 | 99.77 |
| 20.5 | 15,377,901 | | 0.0000 | 1.0000 | 99.76 |
| 21.5 | 15,341,710 | | 0.0000 | 1.0000 | 99.76 |
| 22.5 | 15,253,473 | | 0.0000 | 1.0000 | 99.76 |
| 23.5 | 15,229,499 | | 0.0000 | 1.0000 | 99.76 |
| 24.5 | 15,060,740 | | 0.0000 | 1.0000 | 99.76 |
| 25.5 | 14,274,519 | | 0.0000 | 1.0000 | 99.76 |
| 26.5 | 13,724,745 | | 0.0000 | 1.0000 | 99.76 |
| 27.5 | 13,549,048 | 286,000 | 0.0211 | 0.9789 | 99.76 |
| 28.5 | 12,699,887 | | 0.0000 | 1.0000 | 97.65 |
| 29.5 | 12,659,912 | | 0.0000 | 1.0000 | 97.65 |
| 30.5 | 10,945,808 | | 0.0000 | 1.0000 | 97.65 |
| 31.5 | 10,878,870 | | 0.0000 | 1.0000 | 97.65 |
| 32.5 | 9,092,770 | | 0.0000 | 1.0000 | 97.65 |
| 33.5 | 8,299,505 | | 0.0000 | 1.0000 | 97.65 |
| 34.5 | 7,183,257 | | 0.0000 | 1.0000 | 97.65 |
| 35.5 | 7,061,068 | | 0.0000 | 1.0000 | 97.65 |
| 36.5 | 7,061,068 | | 0.0000 | 1.0000 | 97.65 |
| 37.5 | 4,170,908 | | 0.0000 | 1.0000 | 97.65 |
| 38.5 | 4,145,244 | | 0.0000 | 1.0000 | 97.65 |

NEWFOUNDLAND AND LABRADOR HYDRO

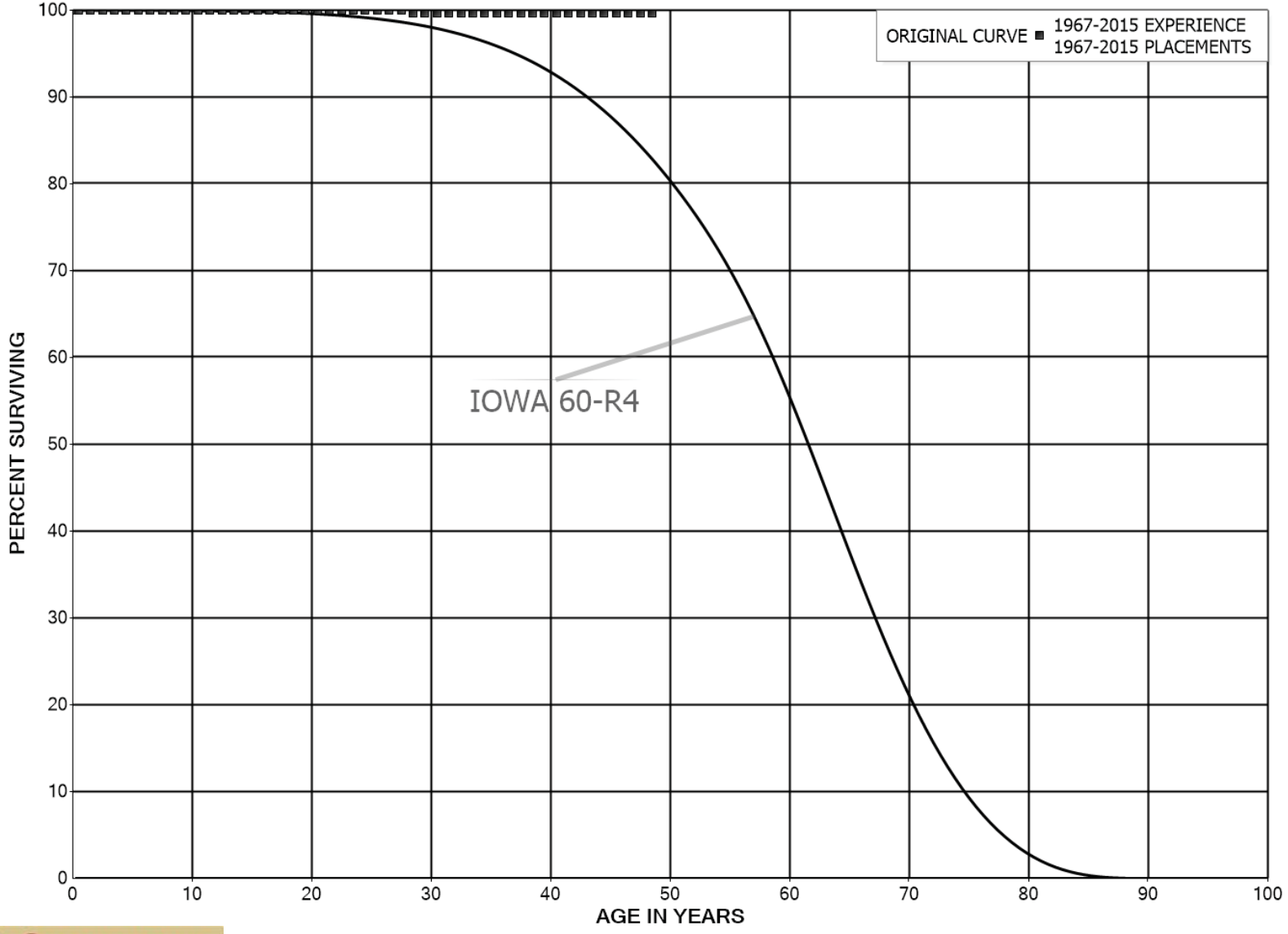
ACCOUNT R12 - RIGHT-OF-WAYS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 4,010,899 | | 0.0000 | 1.0000 | 97.65 |
| 40.5 | 4,010,899 | | 0.0000 | 1.0000 | 97.65 |
| 41.5 | 3,436,307 | | 0.0000 | 1.0000 | 97.65 |
| 42.5 | 3,430,573 | | 0.0000 | 1.0000 | 97.65 |
| 43.5 | 3,430,573 | | 0.0000 | 1.0000 | 97.65 |
| 44.5 | 3,430,573 | | 0.0000 | 1.0000 | 97.65 |
| 45.5 | 3,131,034 | | 0.0000 | 1.0000 | 97.65 |
| 46.5 | 3,045,745 | | 0.0000 | 1.0000 | 97.65 |
| 47.5 | 2,771,429 | | 0.0000 | 1.0000 | 97.65 |
| 48.5 | 1,057,755 | | 0.0000 | 1.0000 | 97.65 |
| 49.5 | | | | | 97.65 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R13 - ROADS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R13 - ROADS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 84,743,338 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 83,803,528 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 83,297,928 | 47 | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 83,246,209 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 83,000,618 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 81,947,247 | 2,866 | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 80,961,124 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 80,636,806 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 80,231,941 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 79,296,607 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 79,296,607 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 77,938,263 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 77,938,263 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 77,170,348 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 77,126,335 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 76,693,992 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 76,538,121 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 76,538,121 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 76,538,121 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 76,522,472 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 76,518,513 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 76,508,506 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 76,483,366 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 76,477,954 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 76,477,954 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 76,423,390 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 76,371,146 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 76,007,793 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 74,701,137 | 294,807 | 0.0039 | 0.9961 | 100.00 |
| 28.5 | 74,406,330 | | 0.0000 | 1.0000 | 99.60 |
| 29.5 | 74,393,088 | | 0.0000 | 1.0000 | 99.60 |
| 30.5 | 74,076,302 | 3,012 | 0.0000 | 1.0000 | 99.60 |
| 31.5 | 13,533,189 | | 0.0000 | 1.0000 | 99.60 |
| 32.5 | 3,934,256 | | 0.0000 | 1.0000 | 99.60 |
| 33.5 | 3,931,345 | | 0.0000 | 1.0000 | 99.60 |
| 34.5 | 3,915,579 | | 0.0000 | 1.0000 | 99.60 |
| 35.5 | 748,219 | | 0.0000 | 1.0000 | 99.60 |
| 36.5 | 743,158 | | 0.0000 | 1.0000 | 99.60 |
| 37.5 | 732,109 | | 0.0000 | 1.0000 | 99.60 |
| 38.5 | 720,351 | | 0.0000 | 1.0000 | 99.60 |

NEWFOUNDLAND AND LABRADOR HYDRO

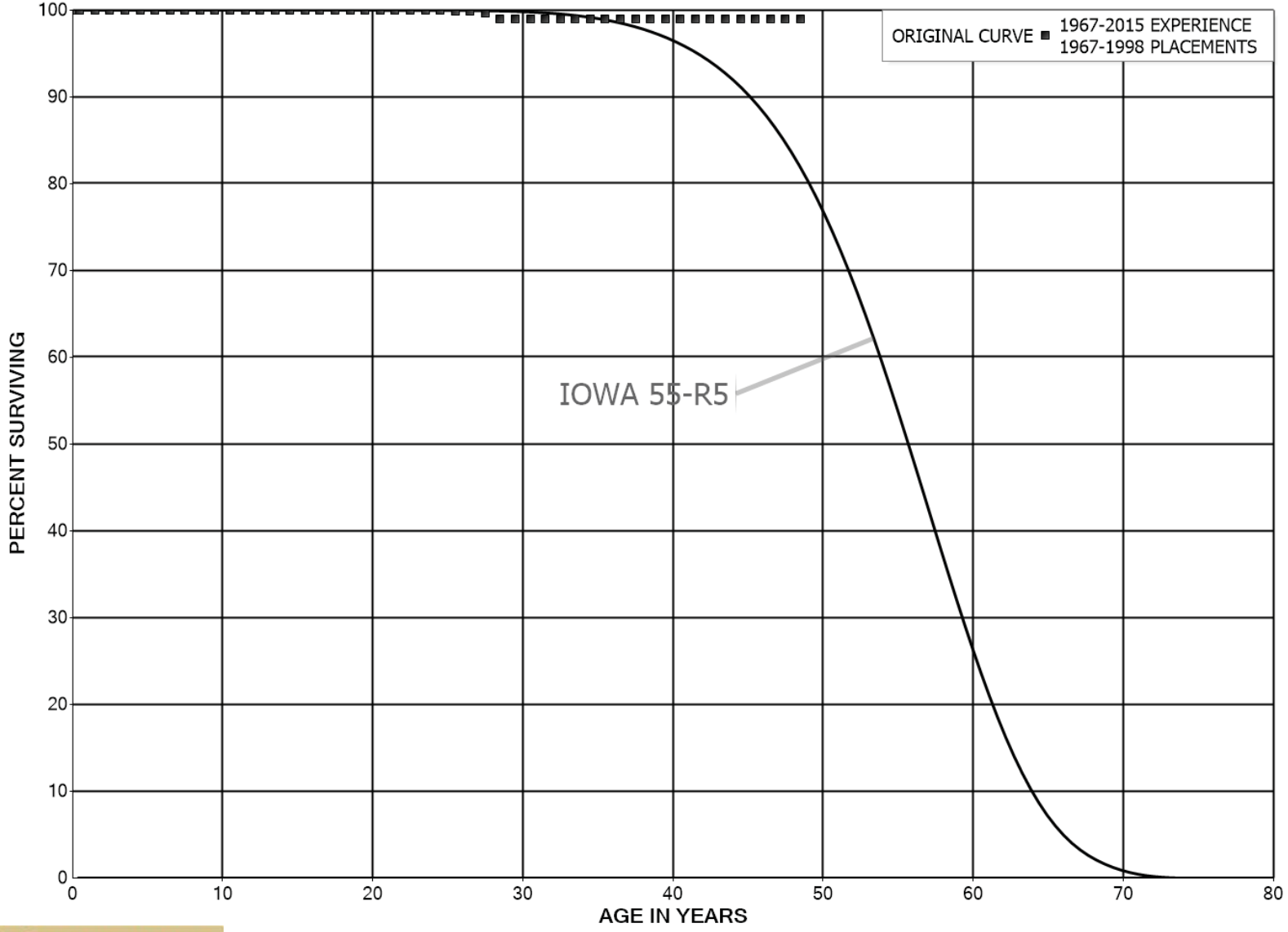
ACCOUNT R13 - ROADS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 720,351 | | 0.0000 | 1.0000 | 99.60 |
| 40.5 | 720,351 | | 0.0000 | 1.0000 | 99.60 |
| 41.5 | 720,351 | | 0.0000 | 1.0000 | 99.60 |
| 42.5 | 709,139 | | 0.0000 | 1.0000 | 99.60 |
| 43.5 | 709,139 | | 0.0000 | 1.0000 | 99.60 |
| 44.5 | 682,139 | | 0.0000 | 1.0000 | 99.60 |
| 45.5 | 553,964 | | 0.0000 | 1.0000 | 99.60 |
| 46.5 | 63,486 | | 0.0000 | 1.0000 | 99.60 |
| 47.5 | 40,993 | | 0.0000 | 1.0000 | 99.60 |
| 48.5 | | | | | 99.60 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT R15 - RUNNER
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R15 - RUNNER

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-1998 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 11,783,932 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 11,737,244 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 11,737,244 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 11,677,403 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 11,677,403 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 11,661,244 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 11,661,244 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 11,661,244 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 11,661,244 | 14,003 | 0.0012 | 0.9988 | 100.00 |
| 25.5 | 11,647,242 | 58 | 0.0000 | 1.0000 | 99.88 |
| 26.5 | 11,063,796 | 28,005 | 0.0025 | 0.9975 | 99.88 |
| 27.5 | 11,035,791 | 72,023 | 0.0065 | 0.9935 | 99.63 |
| 28.5 | 10,963,769 | | 0.0000 | 1.0000 | 98.98 |
| 29.5 | 10,963,769 | | 0.0000 | 1.0000 | 98.98 |
| 30.5 | 8,318,863 | | 0.0000 | 1.0000 | 98.98 |
| 31.5 | 8,318,863 | | 0.0000 | 1.0000 | 98.98 |
| 32.5 | 8,318,863 | | 0.0000 | 1.0000 | 98.98 |
| 33.5 | 8,318,863 | | 0.0000 | 1.0000 | 98.98 |
| 34.5 | 8,318,863 | | 0.0000 | 1.0000 | 98.98 |
| 35.5 | 8,268,519 | | 0.0000 | 1.0000 | 98.98 |
| 36.5 | 8,268,519 | | 0.0000 | 1.0000 | 98.98 |
| 37.5 | 8,268,519 | | 0.0000 | 1.0000 | 98.98 |
| 38.5 | 8,138,207 | | 0.0000 | 1.0000 | 98.98 |

NEWFOUNDLAND AND LABRADOR HYDRO

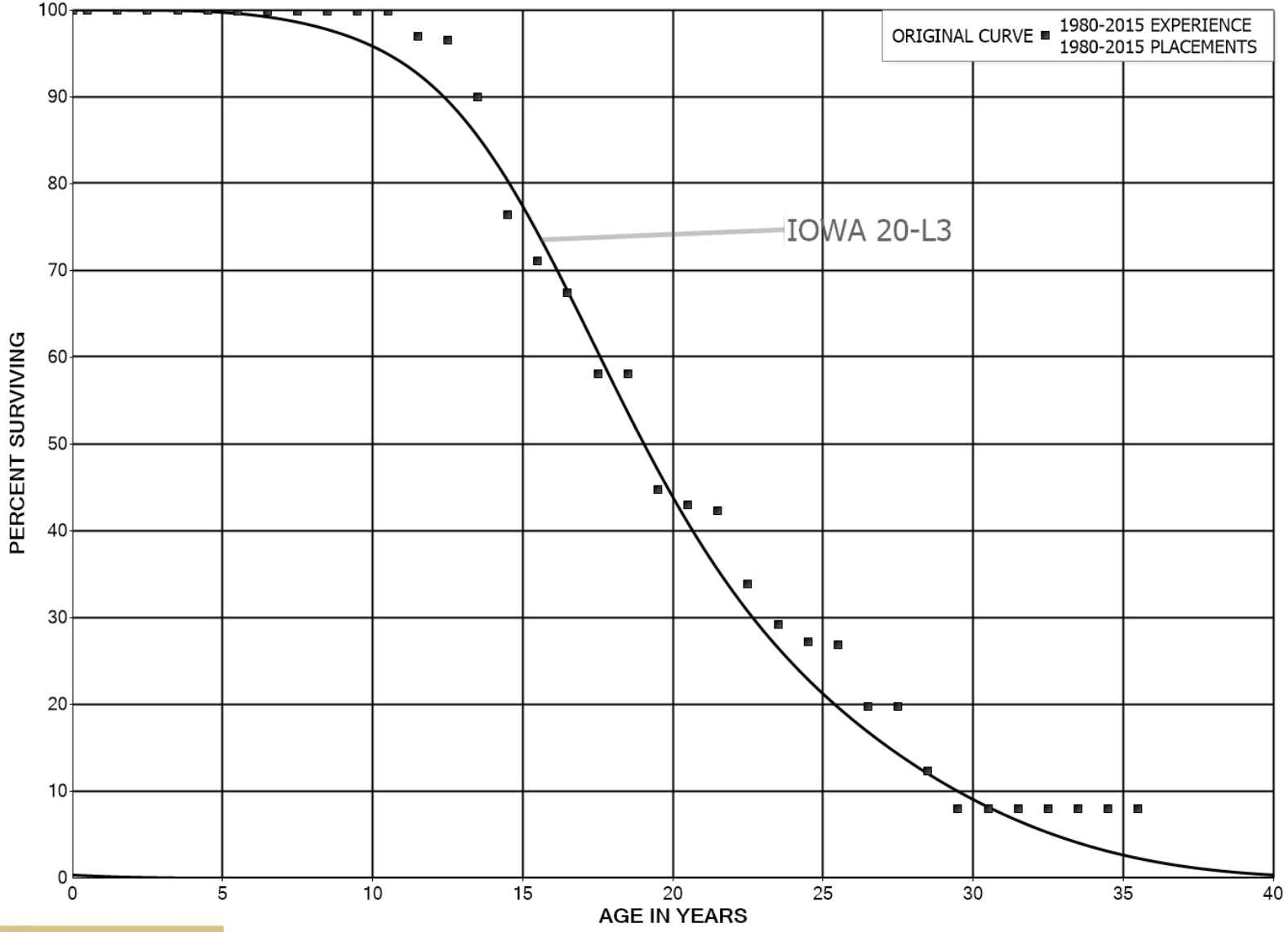
ACCOUNT R15 - RUNNER

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-1998 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 8,138,207 | | 0.0000 | 1.0000 | 98.98 |
| 40.5 | 8,138,207 | | 0.0000 | 1.0000 | 98.98 |
| 41.5 | 8,138,207 | | 0.0000 | 1.0000 | 98.98 |
| 42.5 | 8,138,207 | | 0.0000 | 1.0000 | 98.98 |
| 43.5 | 8,138,207 | | 0.0000 | 1.0000 | 98.98 |
| 44.5 | 8,138,207 | | 0.0000 | 1.0000 | 98.98 |
| 45.5 | 6,679,642 | | 0.0000 | 1.0000 | 98.98 |
| 46.5 | 6,679,642 | | 0.0000 | 1.0000 | 98.98 |
| 47.5 | 5,230,693 | | 0.0000 | 1.0000 | 98.98 |
| 48.5 | | | | | 98.98 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S01 - SCADA EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

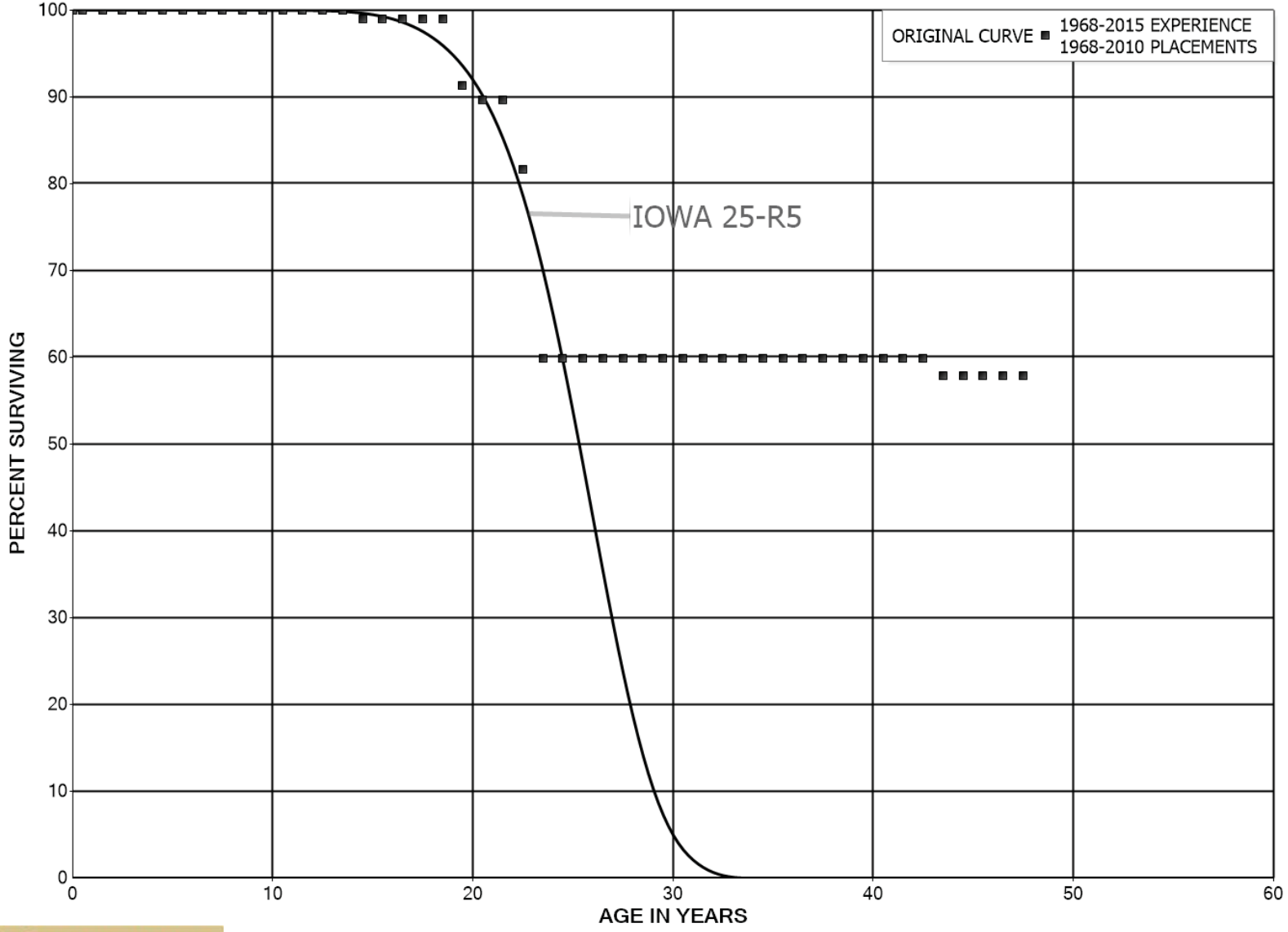
ACCOUNT S01 - SCADA EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1980-2015 EXPERIENCE BAND 1980-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 7,659,317 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 6,863,926 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 6,836,602 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 6,626,915 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 6,553,388 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 6,467,080 | 9,152 | 0.0014 | 0.9986 | 100.00 |
| 5.5 | 6,091,299 | | 0.0000 | 1.0000 | 99.86 |
| 6.5 | 5,839,306 | | 0.0000 | 1.0000 | 99.86 |
| 7.5 | 5,558,497 | | 0.0000 | 1.0000 | 99.86 |
| 8.5 | 5,282,731 | | 0.0000 | 1.0000 | 99.86 |
| 9.5 | 5,056,843 | | 0.0000 | 1.0000 | 99.86 |
| 10.5 | 4,853,295 | 141,749 | 0.0292 | 0.9708 | 99.86 |
| 11.5 | 4,368,191 | 21,620 | 0.0049 | 0.9951 | 96.94 |
| 12.5 | 3,783,706 | 255,345 | 0.0675 | 0.9325 | 96.46 |
| 13.5 | 3,129,541 | 470,373 | 0.1503 | 0.8497 | 89.95 |
| 14.5 | 2,329,086 | 163,210 | 0.0701 | 0.9299 | 76.43 |
| 15.5 | 2,165,876 | 112,977 | 0.0522 | 0.9478 | 71.08 |
| 16.5 | 1,872,257 | 257,060 | 0.1373 | 0.8627 | 67.37 |
| 17.5 | 1,596,218 | | 0.0000 | 1.0000 | 58.12 |
| 18.5 | 1,596,218 | 368,961 | 0.2311 | 0.7689 | 58.12 |
| 19.5 | 1,227,257 | 48,564 | 0.0396 | 0.9604 | 44.69 |
| 20.5 | 1,164,407 | 17,781 | 0.0153 | 0.9847 | 42.92 |
| 21.5 | 1,146,625 | 228,460 | 0.1992 | 0.8008 | 42.26 |
| 22.5 | 918,165 | 127,565 | 0.1389 | 0.8611 | 33.84 |
| 23.5 | 790,600 | 54,709 | 0.0692 | 0.9308 | 29.14 |
| 24.5 | 735,891 | 7,398 | 0.0101 | 0.9899 | 27.12 |
| 25.5 | 655,116 | 174,629 | 0.2666 | 0.7334 | 26.85 |
| 26.5 | 452,574 | 188 | 0.0004 | 0.9996 | 19.69 |
| 27.5 | 452,385 | 171,129 | 0.3783 | 0.6217 | 19.68 |
| 28.5 | 281,256 | 98,514 | 0.3503 | 0.6497 | 12.24 |
| 29.5 | 127,278 | | 0.0000 | 1.0000 | 7.95 |
| 30.5 | 127,278 | | 0.0000 | 1.0000 | 7.95 |
| 31.5 | 127,278 | | 0.0000 | 1.0000 | 7.95 |
| 32.5 | 127,278 | | 0.0000 | 1.0000 | 7.95 |
| 33.5 | 127,278 | | 0.0000 | 1.0000 | 7.95 |
| 34.5 | 127,278 | | 0.0000 | 1.0000 | 7.95 |
| 35.5 | | | | | 7.95 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S02 - SECTIONALIZERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S02 - SECTIONALIZERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2010 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 241,094 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 241,094 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 241,094 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 241,094 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 241,094 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 241,094 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 235,651 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 235,651 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 235,651 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 235,651 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 235,651 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 235,651 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 235,651 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 235,651 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 235,651 | 2,387 | 0.0101 | 0.9899 | 100.00 |
| 14.5 | 233,264 | | 0.0000 | 1.0000 | 98.99 |
| 15.5 | 229,158 | | 0.0000 | 1.0000 | 98.99 |
| 16.5 | 229,158 | | 0.0000 | 1.0000 | 98.99 |
| 17.5 | 229,158 | | 0.0000 | 1.0000 | 98.99 |
| 18.5 | 229,158 | 17,768 | 0.0775 | 0.9225 | 98.99 |
| 19.5 | 189,387 | 3,493 | 0.0184 | 0.9816 | 91.31 |
| 20.5 | 185,893 | | 0.0000 | 1.0000 | 89.63 |
| 21.5 | 185,893 | 16,621 | 0.0894 | 0.9106 | 89.63 |
| 22.5 | 169,272 | 45,060 | 0.2662 | 0.7338 | 81.61 |
| 23.5 | 124,212 | | 0.0000 | 1.0000 | 59.89 |
| 24.5 | 77,660 | | 0.0000 | 1.0000 | 59.89 |
| 25.5 | 77,660 | | 0.0000 | 1.0000 | 59.89 |
| 26.5 | 75,933 | | 0.0000 | 1.0000 | 59.89 |
| 27.5 | 75,933 | | 0.0000 | 1.0000 | 59.89 |
| 28.5 | 75,933 | | 0.0000 | 1.0000 | 59.89 |
| 29.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |
| 30.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |
| 31.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |
| 32.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |
| 33.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |
| 34.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |
| 35.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |
| 36.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |
| 37.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |
| 38.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |

NEWFOUNDLAND AND LABRADOR HYDRO

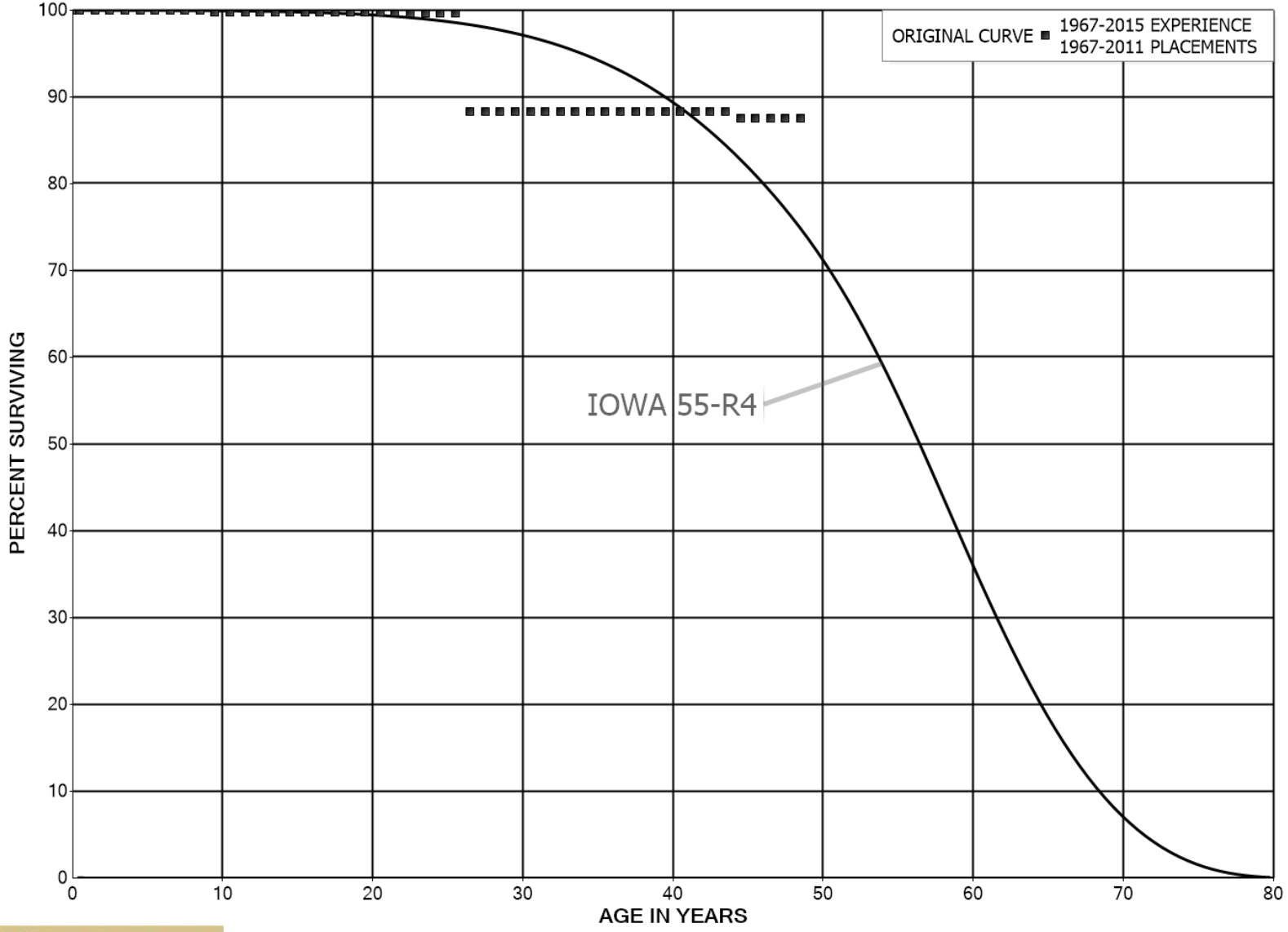
ACCOUNT S02 - SECTIONALIZERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2010 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 73,992 | | 0.0000 | 1.0000 | 59.89 |
| 40.5 | 50,223 | | 0.0000 | 1.0000 | 59.89 |
| 41.5 | 50,223 | | 0.0000 | 1.0000 | 59.89 |
| 42.5 | 50,223 | 1,756 | 0.0350 | 0.9650 | 59.89 |
| 43.5 | 48,467 | | 0.0000 | 1.0000 | 57.79 |
| 44.5 | 48,467 | | 0.0000 | 1.0000 | 57.79 |
| 45.5 | 48,467 | | 0.0000 | 1.0000 | 57.79 |
| 46.5 | 48,467 | | 0.0000 | 1.0000 | 57.79 |
| 47.5 | | | | | 57.79 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S04 - SEWAGE DISPOSAL SYSTEM
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S04 - SEWAGE DISPOSAL SYSTEM

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2011 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 3,028,054 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 3,028,054 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 3,028,054 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 3,028,054 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 3,028,054 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 2,884,687 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 2,758,930 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 2,714,051 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 2,669,446 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 2,611,317 | 8,327 | 0.0032 | 0.9968 | 100.00 |
| 9.5 | 2,567,675 | | 0.0000 | 1.0000 | 99.68 |
| 10.5 | 2,567,675 | | 0.0000 | 1.0000 | 99.68 |
| 11.5 | 2,567,675 | | 0.0000 | 1.0000 | 99.68 |
| 12.5 | 2,469,764 | | 0.0000 | 1.0000 | 99.68 |
| 13.5 | 2,113,937 | | 0.0000 | 1.0000 | 99.68 |
| 14.5 | 2,113,937 | | 0.0000 | 1.0000 | 99.68 |
| 15.5 | 2,113,937 | | 0.0000 | 1.0000 | 99.68 |
| 16.5 | 1,137,751 | | 0.0000 | 1.0000 | 99.68 |
| 17.5 | 1,082,153 | | 0.0000 | 1.0000 | 99.68 |
| 18.5 | 1,077,919 | | 0.0000 | 1.0000 | 99.68 |
| 19.5 | 1,064,436 | | 0.0000 | 1.0000 | 99.68 |
| 20.5 | 933,197 | | 0.0000 | 1.0000 | 99.68 |
| 21.5 | 933,197 | 899 | 0.0010 | 0.9990 | 99.68 |
| 22.5 | 932,298 | | 0.0000 | 1.0000 | 99.59 |
| 23.5 | 916,457 | | 0.0000 | 1.0000 | 99.59 |
| 24.5 | 916,457 | | 0.0000 | 1.0000 | 99.59 |
| 25.5 | 866,450 | 97,985 | 0.1131 | 0.8869 | 99.59 |
| 26.5 | 460,447 | | 0.0000 | 1.0000 | 88.32 |
| 27.5 | 457,750 | | 0.0000 | 1.0000 | 88.32 |
| 28.5 | 457,750 | | 0.0000 | 1.0000 | 88.32 |
| 29.5 | 457,750 | | 0.0000 | 1.0000 | 88.32 |
| 30.5 | 457,750 | | 0.0000 | 1.0000 | 88.32 |
| 31.5 | 457,750 | | 0.0000 | 1.0000 | 88.32 |
| 32.5 | 362,744 | | 0.0000 | 1.0000 | 88.32 |
| 33.5 | 359,744 | | 0.0000 | 1.0000 | 88.32 |
| 34.5 | 357,077 | | 0.0000 | 1.0000 | 88.32 |
| 35.5 | 213,958 | | 0.0000 | 1.0000 | 88.32 |
| 36.5 | 213,958 | | 0.0000 | 1.0000 | 88.32 |
| 37.5 | 179,942 | | 0.0000 | 1.0000 | 88.32 |
| 38.5 | 172,081 | | 0.0000 | 1.0000 | 88.32 |

NEWFOUNDLAND AND LABRADOR HYDRO

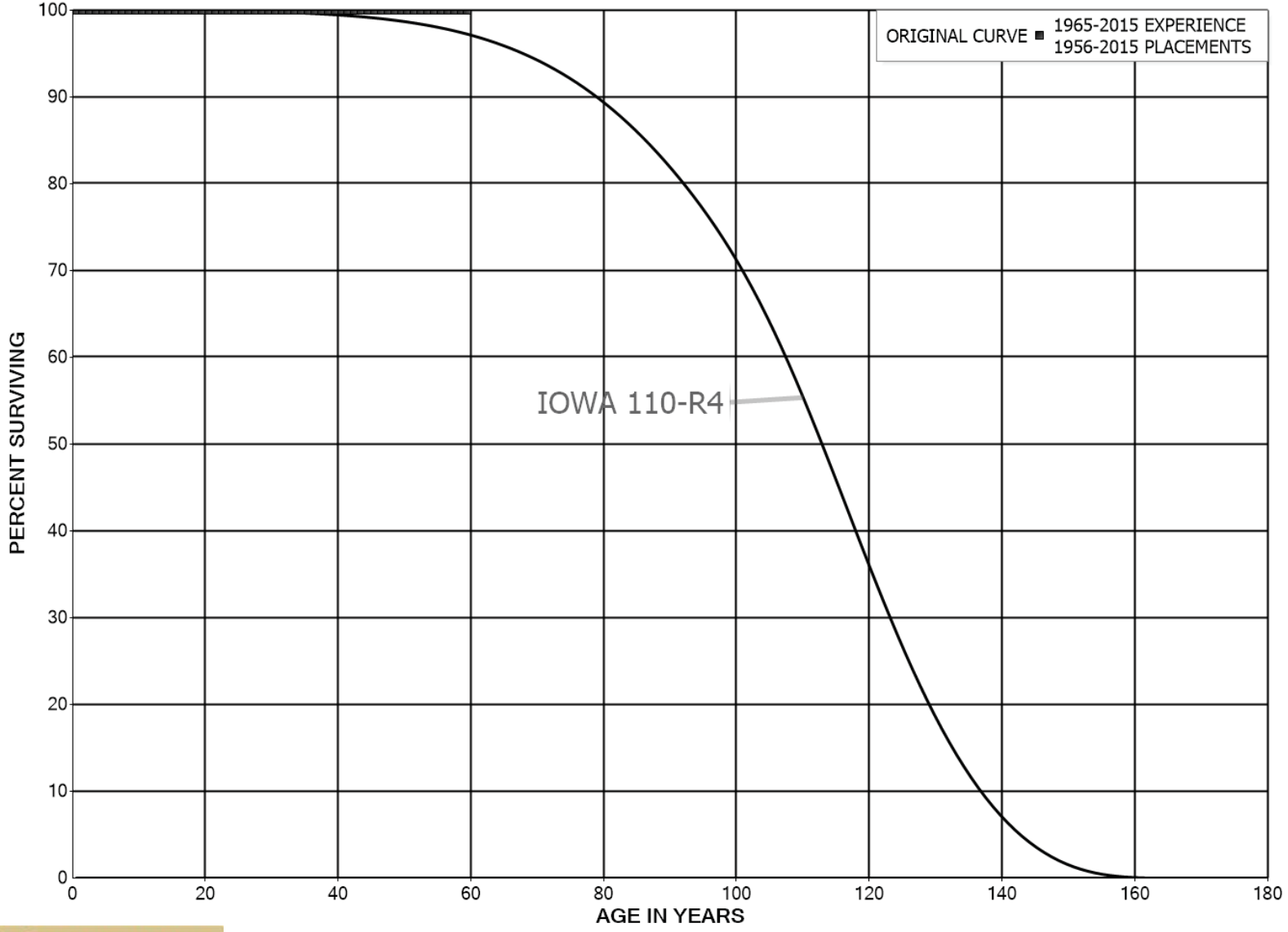
ACCOUNT S04 - SEWAGE DISPOSAL SYSTEM

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2011 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 172,081 | | 0.0000 | 1.0000 | 88.32 |
| 40.5 | 172,081 | | 0.0000 | 1.0000 | 88.32 |
| 41.5 | 172,081 | | 0.0000 | 1.0000 | 88.32 |
| 42.5 | 172,081 | | 0.0000 | 1.0000 | 88.32 |
| 43.5 | 167,427 | 1,523 | 0.0091 | 0.9909 | 88.32 |
| 44.5 | 164,517 | | 0.0000 | 1.0000 | 87.52 |
| 45.5 | 150,432 | | 0.0000 | 1.0000 | 87.52 |
| 46.5 | 17,904 | | 0.0000 | 1.0000 | 87.52 |
| 47.5 | 10,112 | | 0.0000 | 1.0000 | 87.52 |
| 48.5 | | | | | 87.52 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S06 - SPILLWAY STRUCTURES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S06 - SPILLWAY STRUCTURES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1956-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 28,083,039 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 28,033,039 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 28,033,039 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 28,033,039 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 28,033,039 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 28,033,039 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 28,033,039 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 28,033,039 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 28,033,039 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 28,070,270 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 28,070,270 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 28,070,270 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 28,070,270 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 26,332,464 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 26,325,756 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 26,290,175 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 26,290,175 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 26,290,175 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 26,261,403 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 26,261,403 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 26,261,403 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 26,261,403 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 19,750,348 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 19,747,399 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 7,917,388 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 7,917,388 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 7,917,388 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

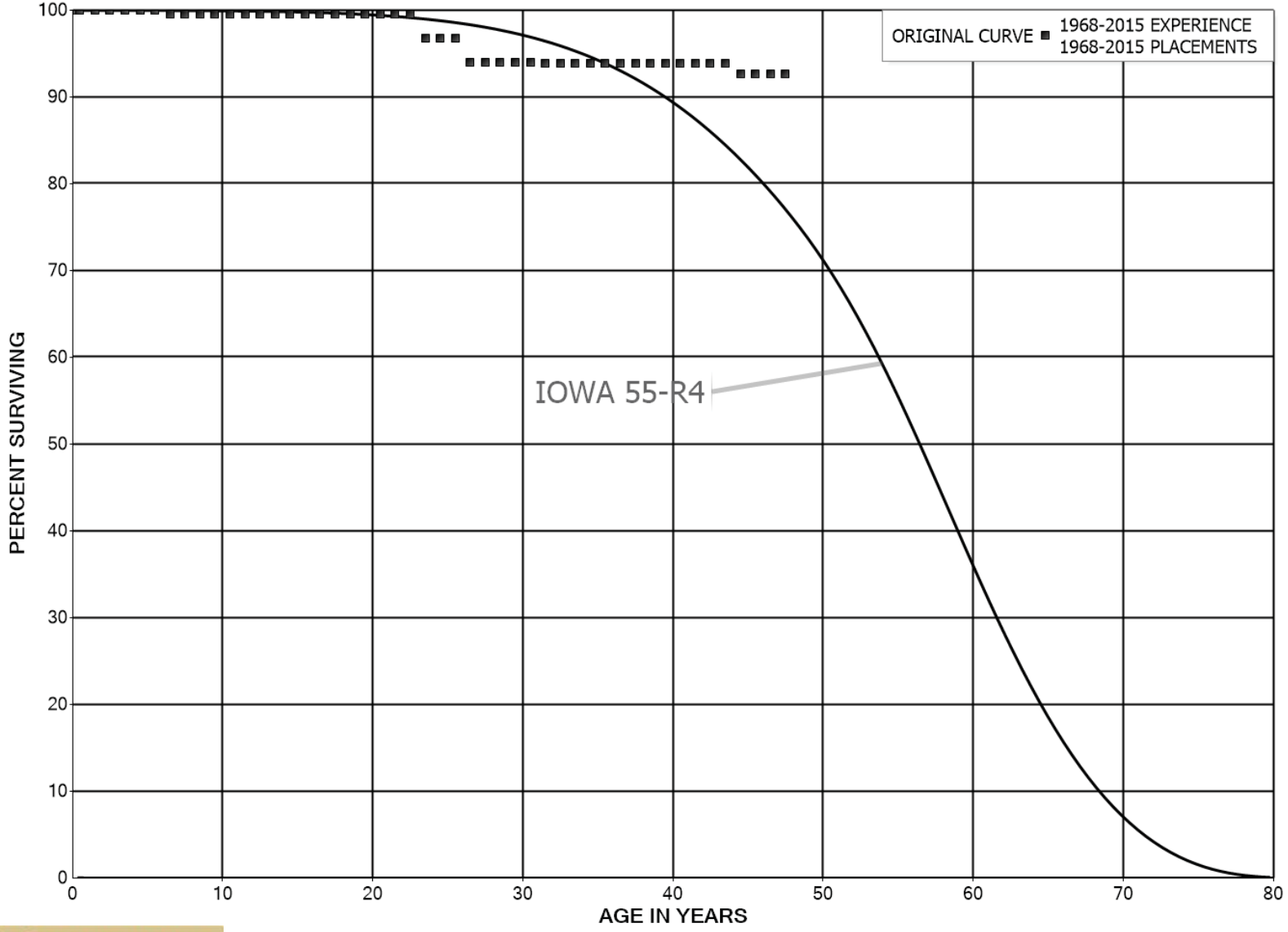
ACCOUNT S06 - SPILLWAY STRUCTURES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1956-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 40.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 41.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 42.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 43.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 44.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 45.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 46.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 47.5 | 4,434,743 | | 0.0000 | 1.0000 | 100.00 |
| 48.5 | 2,173,611 | | 0.0000 | 1.0000 | 100.00 |
| 49.5 | 37,231 | | 0.0000 | 1.0000 | 100.00 |
| 50.5 | 37,231 | | 0.0000 | 1.0000 | 100.00 |
| 51.5 | 37,231 | | 0.0000 | 1.0000 | 100.00 |
| 52.5 | 37,231 | | 0.0000 | 1.0000 | 100.00 |
| 53.5 | 37,231 | | 0.0000 | 1.0000 | 100.00 |
| 54.5 | 37,231 | | 0.0000 | 1.0000 | 100.00 |
| 55.5 | 37,231 | | 0.0000 | 1.0000 | 100.00 |
| 56.5 | 37,231 | | 0.0000 | 1.0000 | 100.00 |
| 57.5 | 37,231 | | 0.0000 | 1.0000 | 100.00 |
| 58.5 | 37,231 | | 0.0000 | 1.0000 | 100.00 |
| 59.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S07 - STACKS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S07 - STACKS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 17,603,104 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 13,821,283 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 13,801,764 | 9,927 | 0.0007 | 0.9993 | 100.00 |
| 2.5 | 13,791,837 | | 0.0000 | 1.0000 | 99.93 |
| 3.5 | 11,609,146 | | 0.0000 | 1.0000 | 99.93 |
| 4.5 | 10,819,314 | | 0.0000 | 1.0000 | 99.93 |
| 5.5 | 10,819,314 | 50,280 | 0.0046 | 0.9954 | 99.93 |
| 6.5 | 10,769,034 | | 0.0000 | 1.0000 | 99.46 |
| 7.5 | 10,479,141 | | 0.0000 | 1.0000 | 99.46 |
| 8.5 | 10,370,962 | | 0.0000 | 1.0000 | 99.46 |
| 9.5 | 10,370,962 | | 0.0000 | 1.0000 | 99.46 |
| 10.5 | 8,301,831 | | 0.0000 | 1.0000 | 99.46 |
| 11.5 | 8,301,831 | | 0.0000 | 1.0000 | 99.46 |
| 12.5 | 8,301,831 | | 0.0000 | 1.0000 | 99.46 |
| 13.5 | 8,301,831 | | 0.0000 | 1.0000 | 99.46 |
| 14.5 | 8,207,809 | | 0.0000 | 1.0000 | 99.46 |
| 15.5 | 8,207,809 | | 0.0000 | 1.0000 | 99.46 |
| 16.5 | 8,207,809 | | 0.0000 | 1.0000 | 99.46 |
| 17.5 | 8,207,809 | | 0.0000 | 1.0000 | 99.46 |
| 18.5 | 8,207,809 | | 0.0000 | 1.0000 | 99.46 |
| 19.5 | 8,086,784 | | 0.0000 | 1.0000 | 99.46 |
| 20.5 | 8,049,829 | | 0.0000 | 1.0000 | 99.46 |
| 21.5 | 8,049,829 | | 0.0000 | 1.0000 | 99.46 |
| 22.5 | 8,049,829 | 225,731 | 0.0280 | 0.9720 | 99.46 |
| 23.5 | 6,975,642 | | 0.0000 | 1.0000 | 96.67 |
| 24.5 | 6,975,642 | | 0.0000 | 1.0000 | 96.67 |
| 25.5 | 6,975,642 | 195,010 | 0.0280 | 0.9720 | 96.67 |
| 26.5 | 6,780,633 | | 0.0000 | 1.0000 | 93.97 |
| 27.5 | 6,774,500 | | 0.0000 | 1.0000 | 93.97 |
| 28.5 | 6,774,500 | | 0.0000 | 1.0000 | 93.97 |
| 29.5 | 6,746,581 | | 0.0000 | 1.0000 | 93.97 |
| 30.5 | 6,746,581 | 12,760 | 0.0019 | 0.9981 | 93.97 |
| 31.5 | 6,733,821 | | 0.0000 | 1.0000 | 93.79 |
| 32.5 | 6,733,821 | | 0.0000 | 1.0000 | 93.79 |
| 33.5 | 6,733,821 | | 0.0000 | 1.0000 | 93.79 |
| 34.5 | 6,733,821 | | 0.0000 | 1.0000 | 93.79 |
| 35.5 | 5,035,613 | | 0.0000 | 1.0000 | 93.79 |
| 36.5 | 5,035,613 | | 0.0000 | 1.0000 | 93.79 |
| 37.5 | 5,035,613 | | 0.0000 | 1.0000 | 93.79 |
| 38.5 | 5,035,613 | | 0.0000 | 1.0000 | 93.79 |

NEWFOUNDLAND AND LABRADOR HYDRO

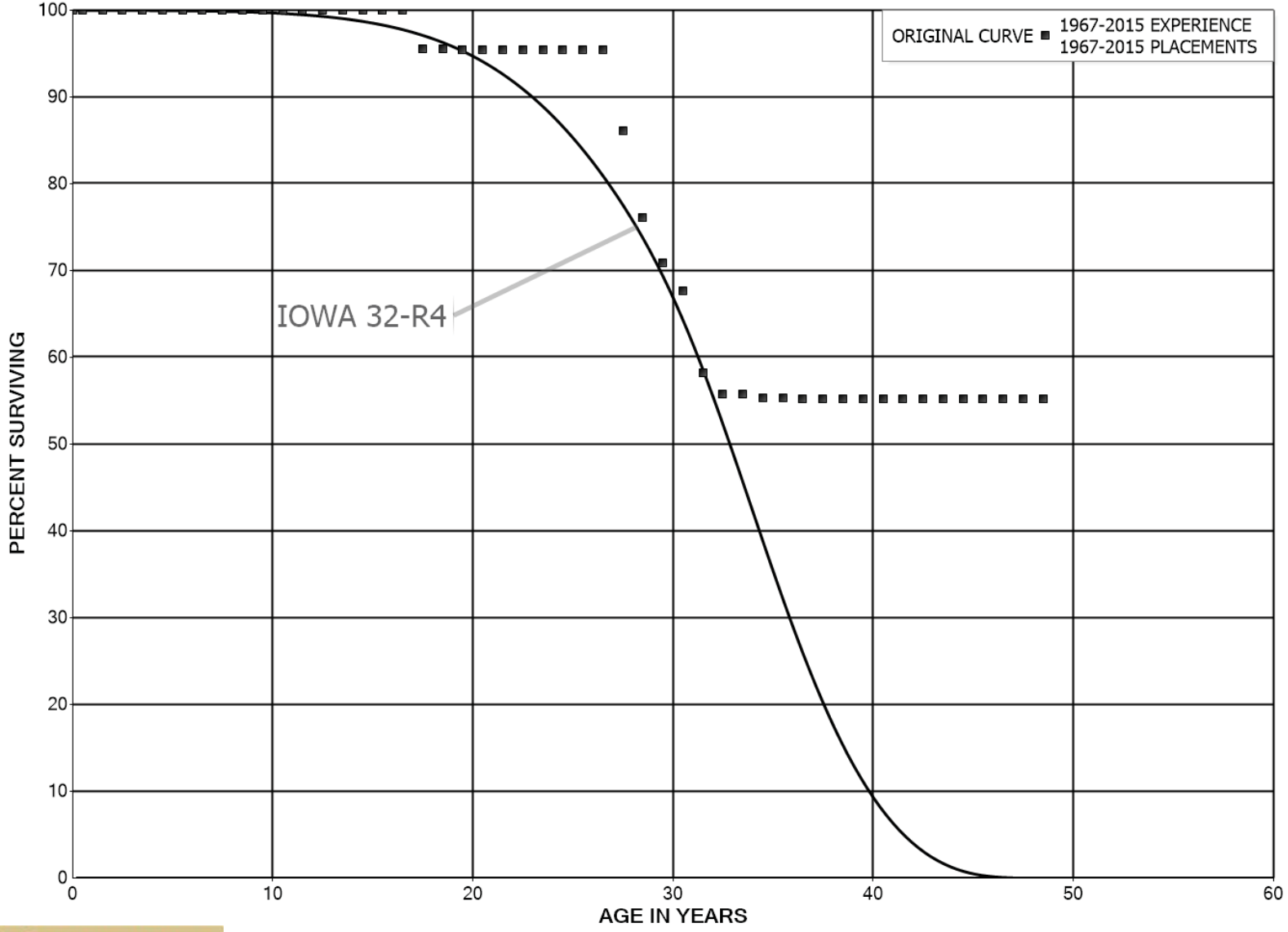
ACCOUNT S07 - STACKS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 5,027,012 | | 0.0000 | 1.0000 | 93.79 |
| 40.5 | 4,365,649 | | 0.0000 | 1.0000 | 93.79 |
| 41.5 | 4,296,040 | | 0.0000 | 1.0000 | 93.79 |
| 42.5 | 4,296,040 | | 0.0000 | 1.0000 | 93.79 |
| 43.5 | 4,296,040 | 56,428 | 0.0131 | 0.9869 | 93.79 |
| 44.5 | 3,809,218 | | 0.0000 | 1.0000 | 92.56 |
| 45.5 | 3,809,218 | | 0.0000 | 1.0000 | 92.56 |
| 46.5 | 3,809,218 | | 0.0000 | 1.0000 | 92.56 |
| 47.5 | | | | | 92.56 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S08 - STATIC EXCITATION SYSTEM
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S08 - STATIC EXCITATION SYSTEM

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 13,697,385 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 13,016,565 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 13,016,565 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 11,796,837 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 11,233,766 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 11,233,766 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 11,233,766 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 11,233,766 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 11,233,766 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 11,233,766 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 11,233,766 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 11,233,766 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 10,585,051 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 9,994,625 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 9,405,190 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 9,388,601 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 9,059,543 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 9,059,543 | 405,819 | 0.0448 | 0.9552 | 100.00 |
| 17.5 | 8,633,626 | | 0.0000 | 1.0000 | 95.52 |
| 18.5 | 8,633,626 | 6,733 | 0.0008 | 0.9992 | 95.52 |
| 19.5 | 8,626,892 | | 0.0000 | 1.0000 | 95.45 |
| 20.5 | 8,626,892 | | 0.0000 | 1.0000 | 95.45 |
| 21.5 | 8,626,892 | | 0.0000 | 1.0000 | 95.45 |
| 22.5 | 8,626,892 | | 0.0000 | 1.0000 | 95.45 |
| 23.5 | 8,498,957 | | 0.0000 | 1.0000 | 95.45 |
| 24.5 | 8,498,957 | | 0.0000 | 1.0000 | 95.45 |
| 25.5 | 8,498,957 | 2,227 | 0.0003 | 0.9997 | 95.45 |
| 26.5 | 8,277,464 | 811,162 | 0.0980 | 0.9020 | 95.42 |
| 27.5 | 7,464,167 | 864,084 | 0.1158 | 0.8842 | 86.07 |
| 28.5 | 6,600,084 | 461,167 | 0.0699 | 0.9301 | 76.11 |
| 29.5 | 6,138,917 | 272,384 | 0.0444 | 0.9556 | 70.79 |
| 30.5 | 5,866,532 | 822,012 | 0.1401 | 0.8599 | 67.65 |
| 31.5 | 5,044,521 | 214,141 | 0.0425 | 0.9575 | 58.17 |
| 32.5 | 4,830,380 | | 0.0000 | 1.0000 | 55.70 |
| 33.5 | 4,805,335 | 32,738 | 0.0068 | 0.9932 | 55.70 |
| 34.5 | 4,772,597 | 5,000 | 0.0010 | 0.9990 | 55.32 |
| 35.5 | 3,277,853 | 5,419 | 0.0017 | 0.9983 | 55.26 |
| 36.5 | 3,272,434 | | 0.0000 | 1.0000 | 55.17 |
| 37.5 | 3,272,434 | | 0.0000 | 1.0000 | 55.17 |
| 38.5 | 3,264,434 | | 0.0000 | 1.0000 | 55.17 |

NEWFOUNDLAND AND LABRADOR HYDRO

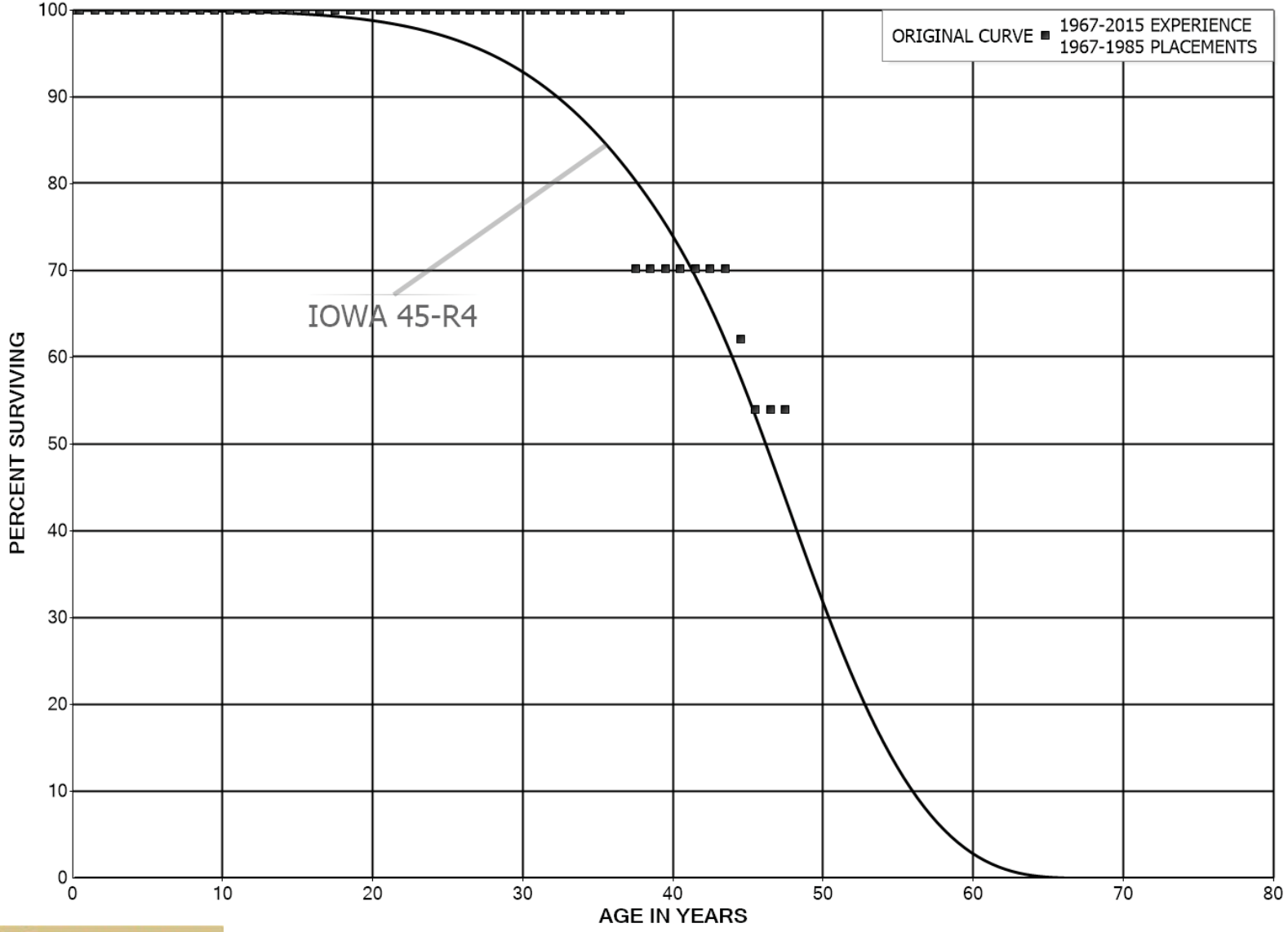
ACCOUNT S08 - STATIC EXCITATION SYSTEM

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 3,256,434 | | 0.0000 | 1.0000 | 55.17 |
| 40.5 | 3,223,516 | | 0.0000 | 1.0000 | 55.17 |
| 41.5 | 3,186,792 | | 0.0000 | 1.0000 | 55.17 |
| 42.5 | 3,186,792 | | 0.0000 | 1.0000 | 55.17 |
| 43.5 | 3,186,792 | | 0.0000 | 1.0000 | 55.17 |
| 44.5 | 3,186,792 | | 0.0000 | 1.0000 | 55.17 |
| 45.5 | 2,498,060 | | 0.0000 | 1.0000 | 55.17 |
| 46.5 | 2,498,060 | | 0.0000 | 1.0000 | 55.17 |
| 47.5 | 951,236 | | 0.0000 | 1.0000 | 55.17 |
| 48.5 | | | | | 55.17 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S09 - STATIC EXCITATION - TRANSFORMERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S09 - STATIC EXCITATION - TRANSFORMERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-1985 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 884,861 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 559,732 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 559,732 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 559,732 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 514,767 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 514,767 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 249,534 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 249,534 | 74,379 | 0.2981 | 0.7019 | 100.00 |
| 37.5 | 168,390 | | 0.0000 | 1.0000 | 70.19 |
| 38.5 | 168,390 | | 0.0000 | 1.0000 | 70.19 |

NEWFOUNDLAND AND LABRADOR HYDRO

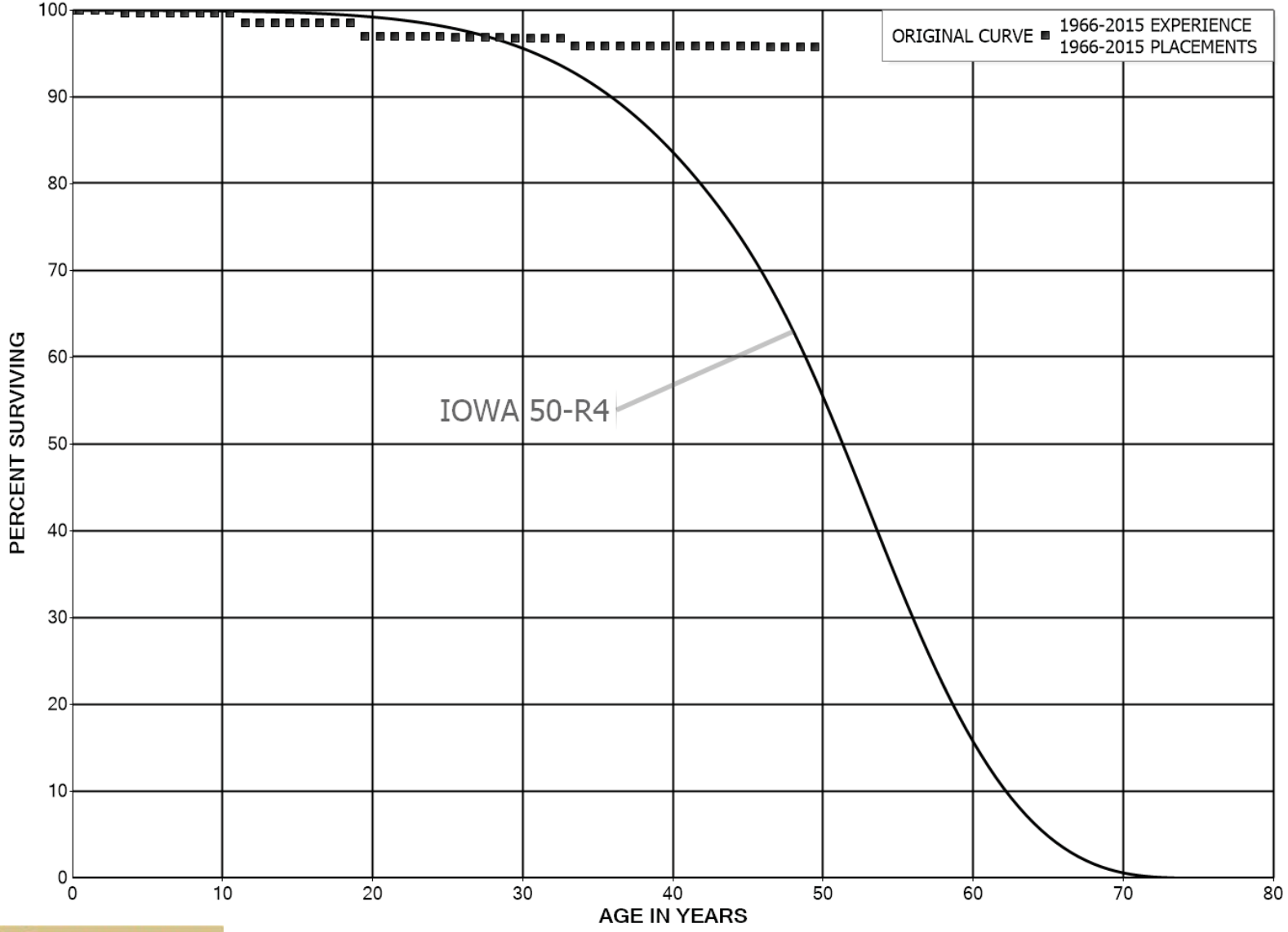
ACCOUNT S09 - STATIC EXCITATION - TRANSFORMERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-1985 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 168,390 | | 0.0000 | 1.0000 | 70.19 |
| 40.5 | 168,390 | | 0.0000 | 1.0000 | 70.19 |
| 41.5 | 168,390 | | 0.0000 | 1.0000 | 70.19 |
| 42.5 | 168,390 | | 0.0000 | 1.0000 | 70.19 |
| 43.5 | 168,390 | 19,468 | 0.1156 | 0.8844 | 70.19 |
| 44.5 | 148,923 | 19,468 | 0.1307 | 0.8693 | 62.08 |
| 45.5 | 129,455 | | 0.0000 | 1.0000 | 53.96 |
| 46.5 | 129,455 | | 0.0000 | 1.0000 | 53.96 |
| 47.5 | 37,221 | 37,221 | 1.0000 | | 53.96 |
| 48.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S10 - STATION SERVICE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S10 - STATION SERVICE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 5,341,141 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 3,777,641 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 3,749,113 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 3,721,185 | 13,370 | 0.0036 | 0.9964 | 100.00 |
| 3.5 | 3,613,933 | | 0.0000 | 1.0000 | 99.64 |
| 4.5 | 3,587,621 | | 0.0000 | 1.0000 | 99.64 |
| 5.5 | 3,569,367 | | 0.0000 | 1.0000 | 99.64 |
| 6.5 | 3,229,864 | | 0.0000 | 1.0000 | 99.64 |
| 7.5 | 2,854,538 | | 0.0000 | 1.0000 | 99.64 |
| 8.5 | 2,854,538 | | 0.0000 | 1.0000 | 99.64 |
| 9.5 | 2,854,538 | | 0.0000 | 1.0000 | 99.64 |
| 10.5 | 2,854,538 | 32,567 | 0.0114 | 0.9886 | 99.64 |
| 11.5 | 2,821,972 | | 0.0000 | 1.0000 | 98.50 |
| 12.5 | 2,821,972 | | 0.0000 | 1.0000 | 98.50 |
| 13.5 | 2,820,609 | | 0.0000 | 1.0000 | 98.50 |
| 14.5 | 2,820,609 | | 0.0000 | 1.0000 | 98.50 |
| 15.5 | 2,820,609 | | 0.0000 | 1.0000 | 98.50 |
| 16.5 | 2,820,609 | | 0.0000 | 1.0000 | 98.50 |
| 17.5 | 2,820,609 | | 0.0000 | 1.0000 | 98.50 |
| 18.5 | 2,820,609 | 45,266 | 0.0160 | 0.9840 | 98.50 |
| 19.5 | 2,692,387 | | 0.0000 | 1.0000 | 96.92 |
| 20.5 | 2,671,359 | | 0.0000 | 1.0000 | 96.92 |
| 21.5 | 2,629,236 | | 0.0000 | 1.0000 | 96.92 |
| 22.5 | 2,626,792 | | 0.0000 | 1.0000 | 96.92 |
| 23.5 | 2,625,906 | 484 | 0.0002 | 0.9998 | 96.92 |
| 24.5 | 2,622,647 | 2,892 | 0.0011 | 0.9989 | 96.91 |
| 25.5 | 2,594,718 | | 0.0000 | 1.0000 | 96.80 |
| 26.5 | 2,496,612 | | 0.0000 | 1.0000 | 96.80 |
| 27.5 | 2,427,377 | | 0.0000 | 1.0000 | 96.80 |
| 28.5 | 2,424,708 | 2,402 | 0.0010 | 0.9990 | 96.80 |
| 29.5 | 2,419,450 | | 0.0000 | 1.0000 | 96.70 |
| 30.5 | 1,907,004 | | 0.0000 | 1.0000 | 96.70 |
| 31.5 | 1,907,004 | | 0.0000 | 1.0000 | 96.70 |
| 32.5 | 1,131,562 | 9,576 | 0.0085 | 0.9915 | 96.70 |
| 33.5 | 1,114,260 | 695 | 0.0006 | 0.9994 | 95.88 |
| 34.5 | 1,104,479 | | 0.0000 | 1.0000 | 95.82 |
| 35.5 | 901,880 | | 0.0000 | 1.0000 | 95.82 |
| 36.5 | 719,873 | | 0.0000 | 1.0000 | 95.82 |
| 37.5 | 710,886 | | 0.0000 | 1.0000 | 95.82 |
| 38.5 | 673,980 | | 0.0000 | 1.0000 | 95.82 |

NEWFOUNDLAND AND LABRADOR HYDRO

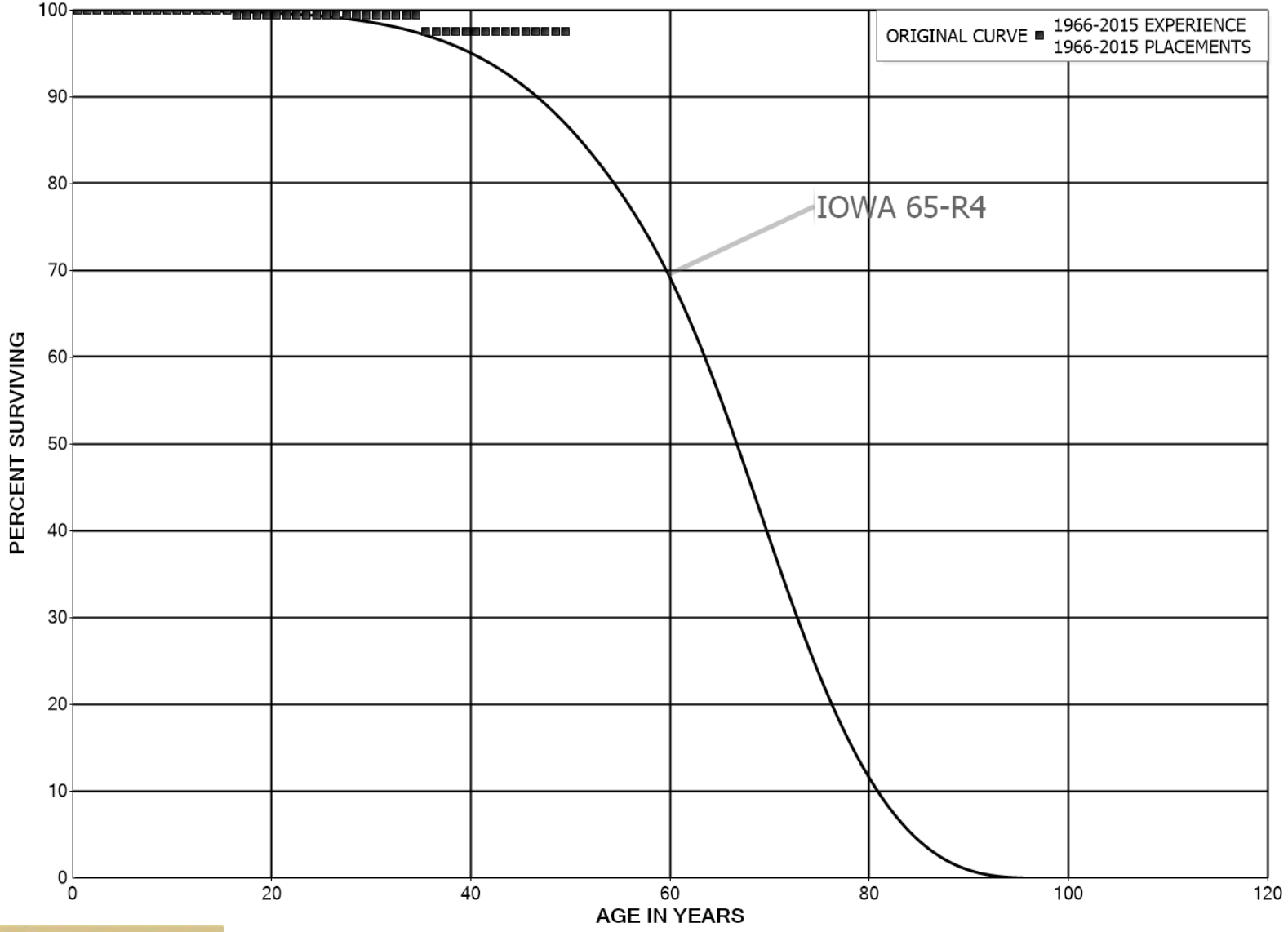
ACCOUNT S10 - STATION SERVICE

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 673,980 | | 0.0000 | 1.0000 | 95.82 |
| 40.5 | 672,480 | | 0.0000 | 1.0000 | 95.82 |
| 41.5 | 672,030 | 237 | 0.0004 | 0.9996 | 95.82 |
| 42.5 | 671,793 | | 0.0000 | 1.0000 | 95.79 |
| 43.5 | 671,793 | | 0.0000 | 1.0000 | 95.79 |
| 44.5 | 519,921 | | 0.0000 | 1.0000 | 95.79 |
| 45.5 | 518,898 | 316 | 0.0006 | 0.9994 | 95.79 |
| 46.5 | 518,582 | | 0.0000 | 1.0000 | 95.73 |
| 47.5 | 511,196 | | 0.0000 | 1.0000 | 95.73 |
| 48.5 | 491,605 | | 0.0000 | 1.0000 | 95.73 |
| 49.5 | | | | | 95.73 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S11 - STOP LOGS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S11 - STOP LOGS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 3,146,969 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 2,853,106 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 2,853,106 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 2,853,106 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 2,853,106 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 2,853,106 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 2,853,106 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 2,853,106 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 2,645,784 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 2,645,784 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 2,645,784 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 2,645,784 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 2,645,784 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 2,510,772 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 2,510,772 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 2,510,772 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 2,510,772 | 16,397 | 0.0065 | 0.9935 | 100.00 |
| 16.5 | 2,471,527 | | 0.0000 | 1.0000 | 99.35 |
| 17.5 | 2,448,776 | | 0.0000 | 1.0000 | 99.35 |
| 18.5 | 2,448,776 | | 0.0000 | 1.0000 | 99.35 |
| 19.5 | 2,448,776 | | 0.0000 | 1.0000 | 99.35 |
| 20.5 | 2,448,776 | | 0.0000 | 1.0000 | 99.35 |
| 21.5 | 2,448,776 | | 0.0000 | 1.0000 | 99.35 |
| 22.5 | 2,448,776 | | 0.0000 | 1.0000 | 99.35 |
| 23.5 | 2,448,776 | | 0.0000 | 1.0000 | 99.35 |
| 24.5 | 2,448,776 | | 0.0000 | 1.0000 | 99.35 |
| 25.5 | 2,448,776 | | 0.0000 | 1.0000 | 99.35 |
| 26.5 | 2,448,776 | | 0.0000 | 1.0000 | 99.35 |
| 27.5 | 2,383,388 | | 0.0000 | 1.0000 | 99.35 |
| 28.5 | 2,383,388 | | 0.0000 | 1.0000 | 99.35 |
| 29.5 | 2,383,388 | | 0.0000 | 1.0000 | 99.35 |
| 30.5 | 2,383,388 | | 0.0000 | 1.0000 | 99.35 |
| 31.5 | 2,187,620 | | 0.0000 | 1.0000 | 99.35 |
| 32.5 | 2,175,246 | | 0.0000 | 1.0000 | 99.35 |
| 33.5 | 884,391 | | 0.0000 | 1.0000 | 99.35 |
| 34.5 | 884,391 | 16,475 | 0.0186 | 0.9814 | 99.35 |
| 35.5 | 867,916 | | 0.0000 | 1.0000 | 97.50 |
| 36.5 | 305,958 | | 0.0000 | 1.0000 | 97.50 |
| 37.5 | 305,958 | | 0.0000 | 1.0000 | 97.50 |
| 38.5 | 305,958 | | 0.0000 | 1.0000 | 97.50 |

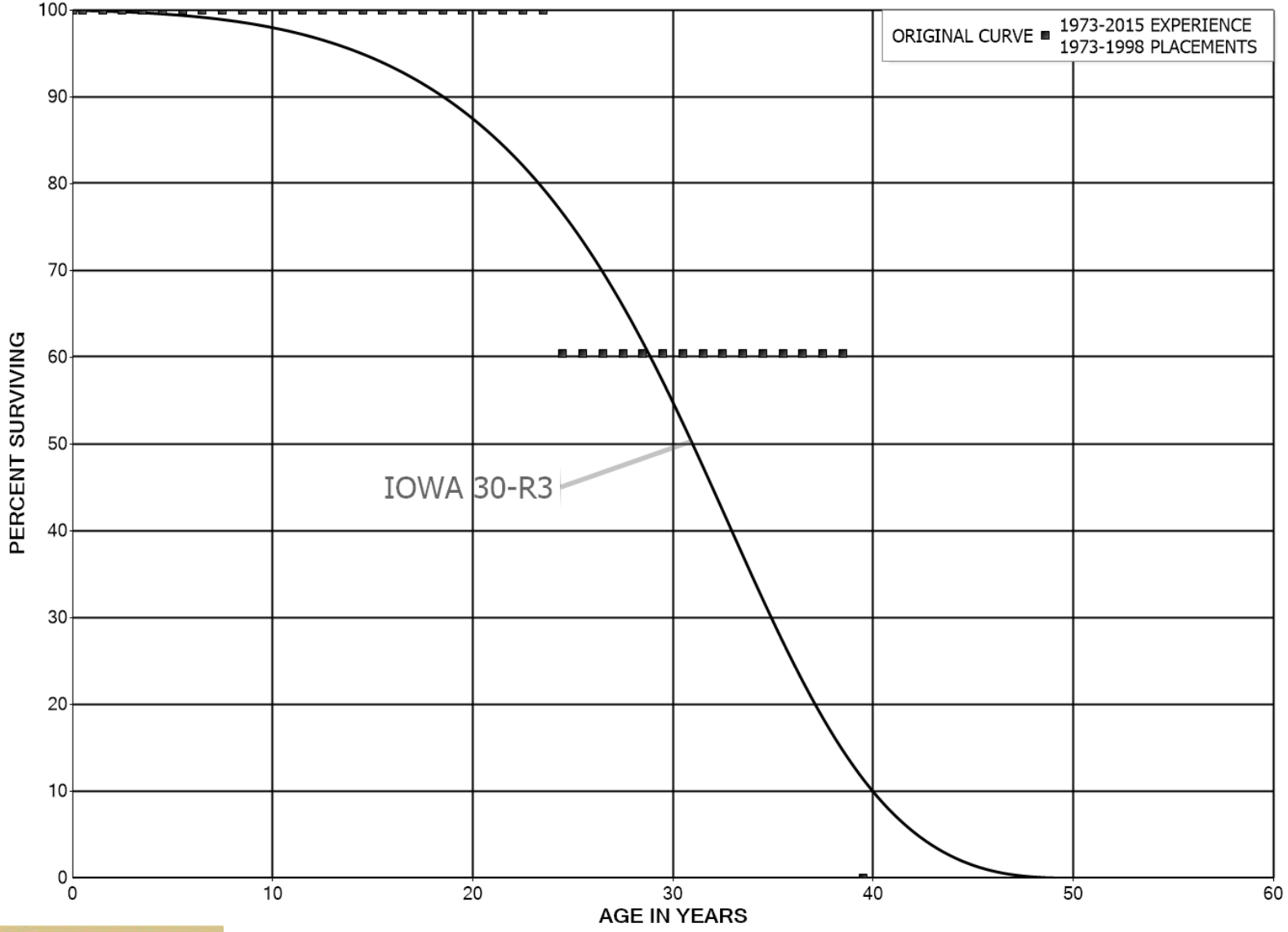
NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S11 - STOP LOGS

ORIGINAL LIFE TABLE, CONT.

| PLACEMENT BAND 1966-2015 | | | EXPERIENCE BAND 1966-2015 | | |
|---|---|---|---|---|---|
| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
| 39.5 | 305,958 | | 0.0000 | 1.0000 | 97.50 |
| 40.5 | 305,958 | | 0.0000 | 1.0000 | 97.50 |
| 41.5 | 305,958 | | 0.0000 | 1.0000 | 97.50 |
| 42.5 | 305,958 | | 0.0000 | 1.0000 | 97.50 |
| 43.5 | 305,958 | | 0.0000 | 1.0000 | 97.50 |
| 44.5 | 305,958 | | 0.0000 | 1.0000 | 97.50 |
| 45.5 | 285,958 | | 0.0000 | 1.0000 | 97.50 |
| 46.5 | 285,958 | | 0.0000 | 1.0000 | 97.50 |
| 47.5 | 285,958 | | 0.0000 | 1.0000 | 97.50 |
| 48.5 | 137,480 | | 0.0000 | 1.0000 | 97.50 |
| 49.5 | | | | | 97.50 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S12 - STORAGE PALLETS AND RACKINGS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

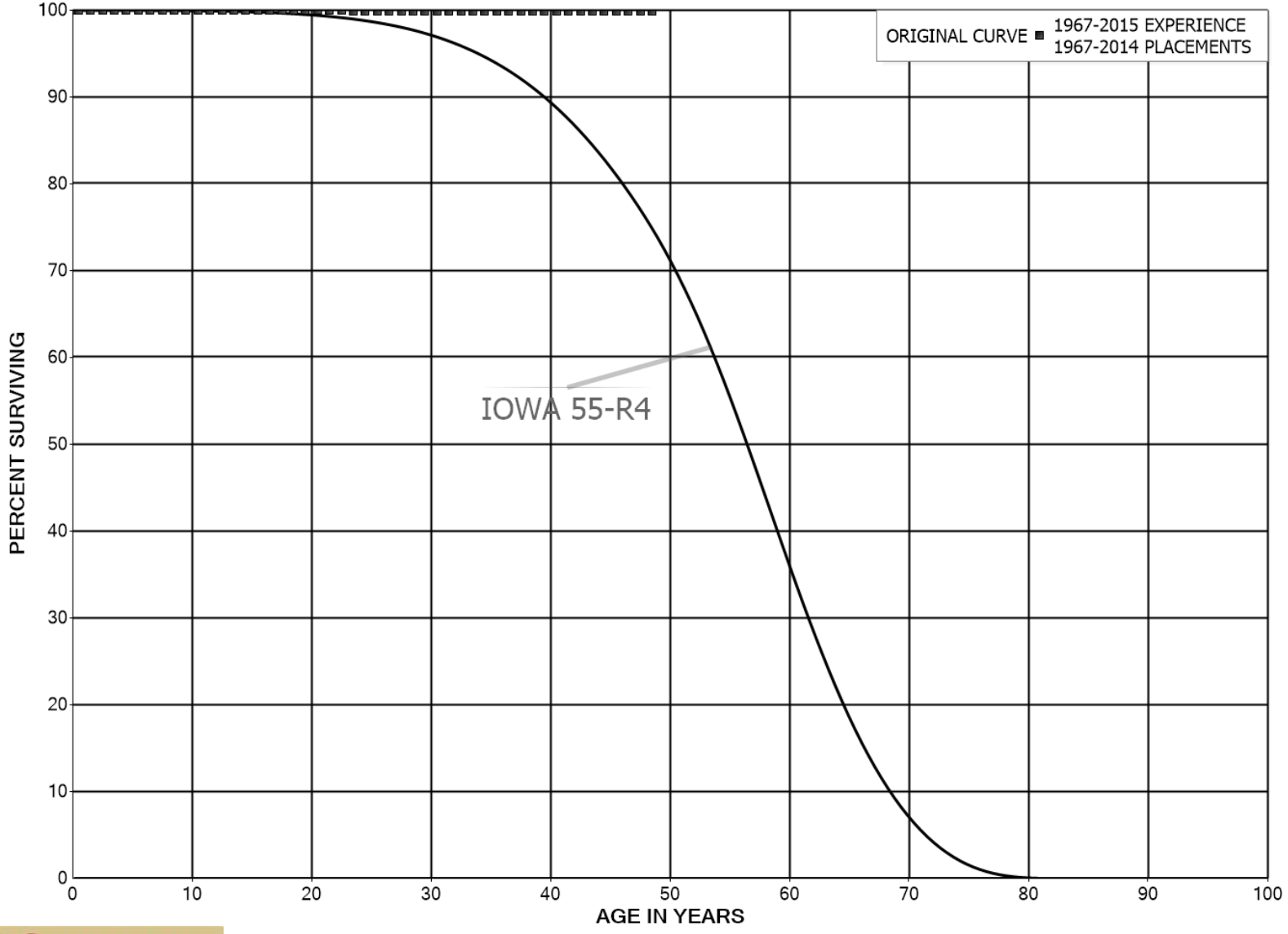
ACCOUNT S12 - STORAGE PALLETS AND RACKINGS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1973-1998 EXPERIENCE BAND 1973-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 33,439 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 29,742 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 29,742 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 29,742 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 29,742 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 29,742 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 29,742 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 29,742 | 11,790 | 0.3964 | 0.6036 | 100.00 |
| 24.5 | 17,952 | | 0.0000 | 1.0000 | 60.36 |
| 25.5 | 17,952 | | 0.0000 | 1.0000 | 60.36 |
| 26.5 | 17,952 | | 0.0000 | 1.0000 | 60.36 |
| 27.5 | 17,952 | | 0.0000 | 1.0000 | 60.36 |
| 28.5 | 17,952 | | 0.0000 | 1.0000 | 60.36 |
| 29.5 | 17,952 | | 0.0000 | 1.0000 | 60.36 |
| 30.5 | 17,952 | | 0.0000 | 1.0000 | 60.36 |
| 31.5 | 7,245 | | 0.0000 | 1.0000 | 60.36 |
| 32.5 | 7,245 | | 0.0000 | 1.0000 | 60.36 |
| 33.5 | 7,245 | | 0.0000 | 1.0000 | 60.36 |
| 34.5 | 7,245 | | 0.0000 | 1.0000 | 60.36 |
| 35.5 | 7,245 | | 0.0000 | 1.0000 | 60.36 |
| 36.5 | 7,245 | | 0.0000 | 1.0000 | 60.36 |
| 37.5 | 7,245 | | 0.0000 | 1.0000 | 60.36 |
| 38.5 | 7,245 | 7,245 | 1.0000 | | 60.36 |
| 39.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S13 - STORM AND YARD DRAINAGE
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S13 - STORM AND YARD DRAINAGE

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2014 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 1,311,021 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 1,311,021 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 1,274,643 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 1,199,628 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,199,628 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 1,199,628 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 1,199,628 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 1,132,337 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 1,100,589 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 1,100,589 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 1,100,589 | 2,307 | 0.0021 | 0.9979 | 100.00 |
| 23.5 | 1,058,425 | | 0.0000 | 1.0000 | 99.79 |
| 24.5 | 1,028,005 | | 0.0000 | 1.0000 | 99.79 |
| 25.5 | 991,410 | | 0.0000 | 1.0000 | 99.79 |
| 26.5 | 988,122 | | 0.0000 | 1.0000 | 99.79 |
| 27.5 | 987,158 | | 0.0000 | 1.0000 | 99.79 |
| 28.5 | 981,498 | | 0.0000 | 1.0000 | 99.79 |
| 29.5 | 981,498 | | 0.0000 | 1.0000 | 99.79 |
| 30.5 | 607,268 | | 0.0000 | 1.0000 | 99.79 |
| 31.5 | 607,268 | | 0.0000 | 1.0000 | 99.79 |
| 32.5 | 369,288 | | 0.0000 | 1.0000 | 99.79 |
| 33.5 | 369,288 | | 0.0000 | 1.0000 | 99.79 |
| 34.5 | 369,288 | | 0.0000 | 1.0000 | 99.79 |
| 35.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |
| 36.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |
| 37.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |
| 38.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |

NEWFOUNDLAND AND LABRADOR HYDRO

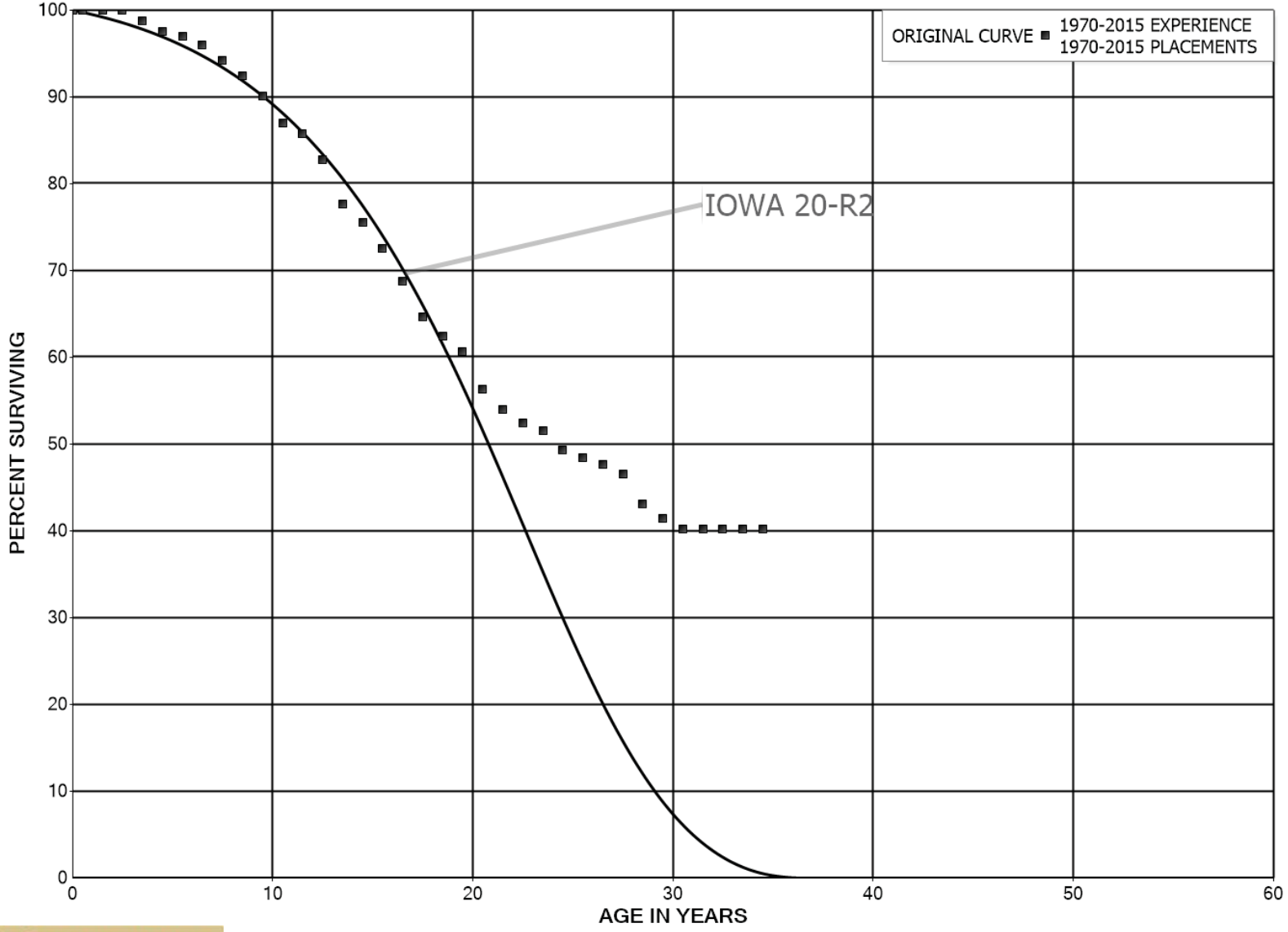
ACCOUNT S13 - STORM AND YARD DRAINAGE

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2014 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |
| 40.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |
| 41.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |
| 42.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |
| 43.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |
| 44.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |
| 45.5 | 108,814 | | 0.0000 | 1.0000 | 99.79 |
| 46.5 | 3,047 | | 0.0000 | 1.0000 | 99.79 |
| 47.5 | 3,047 | | 0.0000 | 1.0000 | 99.79 |
| 48.5 | | | | | 99.79 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S14 - STREET LIGHTS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

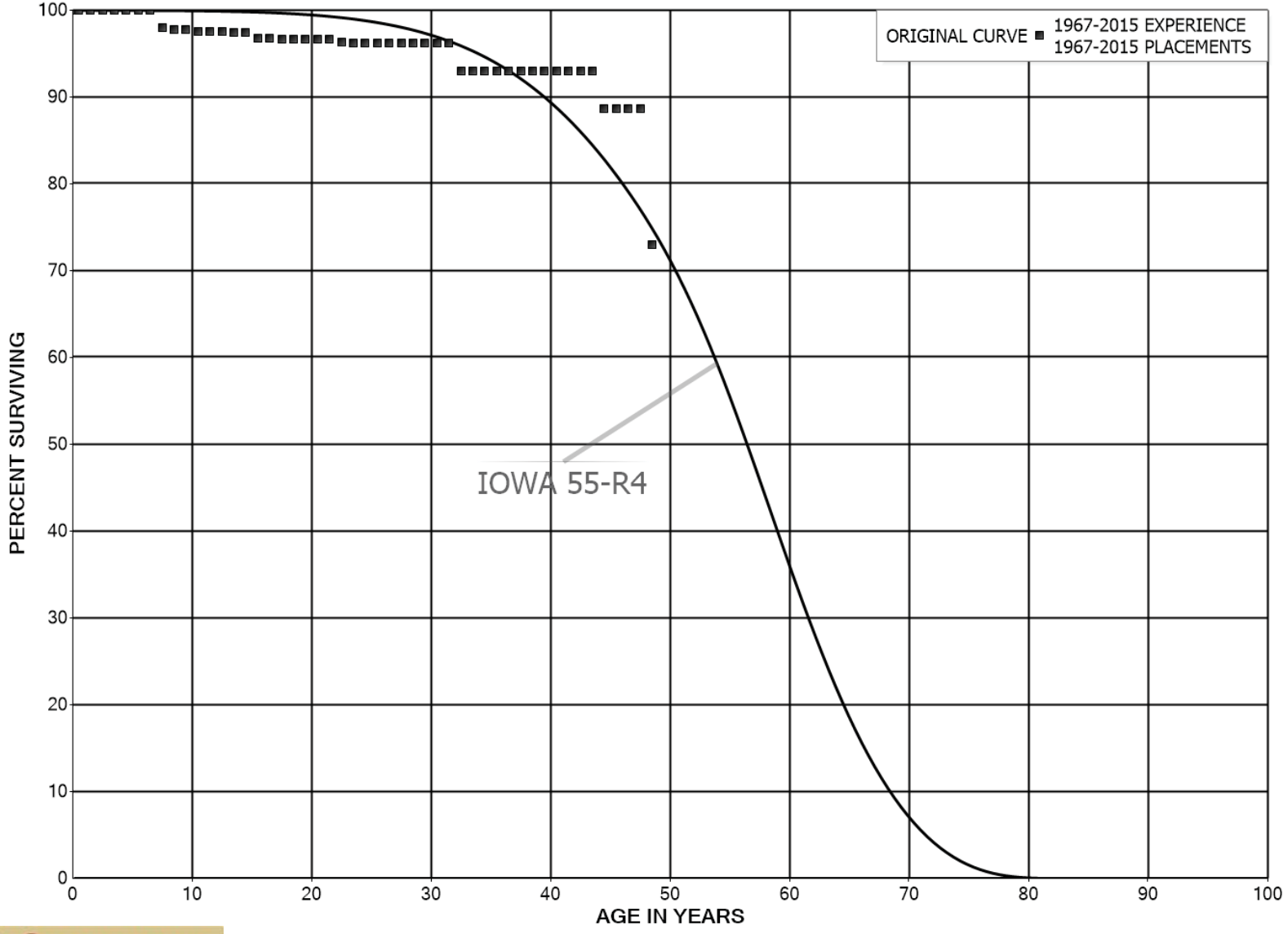
ACCOUNT S14 - STREET LIGHTS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1970-2015 EXPERIENCE BAND 1970-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 4,790,929 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 4,505,158 | 911 | 0.0002 | 0.9998 | 100.00 |
| 1.5 | 4,310,573 | 3,122 | 0.0007 | 0.9993 | 99.98 |
| 2.5 | 4,017,528 | 48,174 | 0.0120 | 0.9880 | 99.91 |
| 3.5 | 3,781,275 | 44,305 | 0.0117 | 0.9883 | 98.71 |
| 4.5 | 3,463,905 | 21,013 | 0.0061 | 0.9939 | 97.55 |
| 5.5 | 3,252,992 | 34,922 | 0.0107 | 0.9893 | 96.96 |
| 6.5 | 2,986,806 | 55,916 | 0.0187 | 0.9813 | 95.92 |
| 7.5 | 2,712,883 | 50,181 | 0.0185 | 0.9815 | 94.12 |
| 8.5 | 2,493,576 | 61,414 | 0.0246 | 0.9754 | 92.38 |
| 9.5 | 2,236,371 | 78,382 | 0.0350 | 0.9650 | 90.11 |
| 10.5 | 1,985,921 | 27,513 | 0.0139 | 0.9861 | 86.95 |
| 11.5 | 1,761,238 | 62,823 | 0.0357 | 0.9643 | 85.75 |
| 12.5 | 1,515,266 | 92,607 | 0.0611 | 0.9389 | 82.69 |
| 13.5 | 1,309,392 | 36,720 | 0.0280 | 0.9720 | 77.63 |
| 14.5 | 1,143,152 | 44,150 | 0.0386 | 0.9614 | 75.46 |
| 15.5 | 996,794 | 51,929 | 0.0521 | 0.9479 | 72.54 |
| 16.5 | 865,991 | 52,125 | 0.0602 | 0.9398 | 68.76 |
| 17.5 | 734,874 | 25,057 | 0.0341 | 0.9659 | 64.62 |
| 18.5 | 549,678 | 15,726 | 0.0286 | 0.9714 | 62.42 |
| 19.5 | 490,774 | 34,789 | 0.0709 | 0.9291 | 60.63 |
| 20.5 | 435,479 | 18,446 | 0.0424 | 0.9576 | 56.34 |
| 21.5 | 381,184 | 10,866 | 0.0285 | 0.9715 | 53.95 |
| 22.5 | 333,063 | 6,064 | 0.0182 | 0.9818 | 52.41 |
| 23.5 | 293,605 | 12,659 | 0.0431 | 0.9569 | 51.46 |
| 24.5 | 265,247 | 4,394 | 0.0166 | 0.9834 | 49.24 |
| 25.5 | 196,675 | 3,062 | 0.0156 | 0.9844 | 48.42 |
| 26.5 | 153,525 | 3,757 | 0.0245 | 0.9755 | 47.67 |
| 27.5 | 120,007 | 8,967 | 0.0747 | 0.9253 | 46.50 |
| 28.5 | 95,102 | 3,573 | 0.0376 | 0.9624 | 43.03 |
| 29.5 | 81,271 | 2,376 | 0.0292 | 0.9708 | 41.41 |
| 30.5 | 78,895 | | 0.0000 | 1.0000 | 40.20 |
| 31.5 | 64,024 | | 0.0000 | 1.0000 | 40.20 |
| 32.5 | 62,054 | | 0.0000 | 1.0000 | 40.20 |
| 33.5 | 54,256 | | 0.0000 | 1.0000 | 40.20 |
| 34.5 | | | | | 40.20 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S15 - STRUCTURAL SUPPORTS (WOOD OR STEEL)
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S15 - STRUCTURAL SUPPORTS (WOOD OR STEEL)

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 12,277,223 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 12,179,460 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 11,871,197 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 11,871,197 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 10,317,542 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 10,288,677 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 10,062,423 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 9,992,435 | 207,829 | 0.0208 | 0.9792 | 100.00 |
| 7.5 | 9,751,260 | 21,304 | 0.0022 | 0.9978 | 97.92 |
| 8.5 | 9,297,859 | | 0.0000 | 1.0000 | 97.71 |
| 9.5 | 9,278,982 | 24,028 | 0.0026 | 0.9974 | 97.71 |
| 10.5 | 9,236,985 | | 0.0000 | 1.0000 | 97.45 |
| 11.5 | 9,222,195 | | 0.0000 | 1.0000 | 97.45 |
| 12.5 | 9,036,221 | 1,793 | 0.0002 | 0.9998 | 97.45 |
| 13.5 | 8,939,304 | 5,431 | 0.0006 | 0.9994 | 97.43 |
| 14.5 | 8,882,032 | 63,993 | 0.0072 | 0.9928 | 97.37 |
| 15.5 | 8,513,296 | | 0.0000 | 1.0000 | 96.67 |
| 16.5 | 8,493,894 | 502 | 0.0001 | 0.9999 | 96.67 |
| 17.5 | 8,296,190 | | 0.0000 | 1.0000 | 96.67 |
| 18.5 | 8,240,559 | | 0.0000 | 1.0000 | 96.67 |
| 19.5 | 7,961,861 | 500 | 0.0001 | 0.9999 | 96.67 |
| 20.5 | 7,350,657 | | 0.0000 | 1.0000 | 96.66 |
| 21.5 | 7,182,086 | 26,788 | 0.0037 | 0.9963 | 96.66 |
| 22.5 | 7,100,924 | 5,780 | 0.0008 | 0.9992 | 96.30 |
| 23.5 | 6,483,604 | 3,186 | 0.0005 | 0.9995 | 96.22 |
| 24.5 | 6,059,754 | | 0.0000 | 1.0000 | 96.18 |
| 25.5 | 5,163,851 | | 0.0000 | 1.0000 | 96.18 |
| 26.5 | 4,771,442 | | 0.0000 | 1.0000 | 96.18 |
| 27.5 | 4,692,431 | | 0.0000 | 1.0000 | 96.18 |
| 28.5 | 4,383,596 | | 0.0000 | 1.0000 | 96.18 |
| 29.5 | 4,307,874 | | 0.0000 | 1.0000 | 96.18 |
| 30.5 | 4,296,130 | | 0.0000 | 1.0000 | 96.18 |
| 31.5 | 4,281,964 | 140,974 | 0.0329 | 0.9671 | 96.18 |
| 32.5 | 3,825,207 | 2,126 | 0.0006 | 0.9994 | 93.01 |
| 33.5 | 3,148,194 | 274 | 0.0001 | 0.9999 | 92.96 |
| 34.5 | 2,886,049 | | 0.0000 | 1.0000 | 92.95 |
| 35.5 | 2,632,494 | | 0.0000 | 1.0000 | 92.95 |
| 36.5 | 2,266,710 | | 0.0000 | 1.0000 | 92.95 |
| 37.5 | 1,426,301 | | 0.0000 | 1.0000 | 92.95 |
| 38.5 | 1,272,759 | | 0.0000 | 1.0000 | 92.95 |

NEWFOUNDLAND AND LABRADOR HYDRO

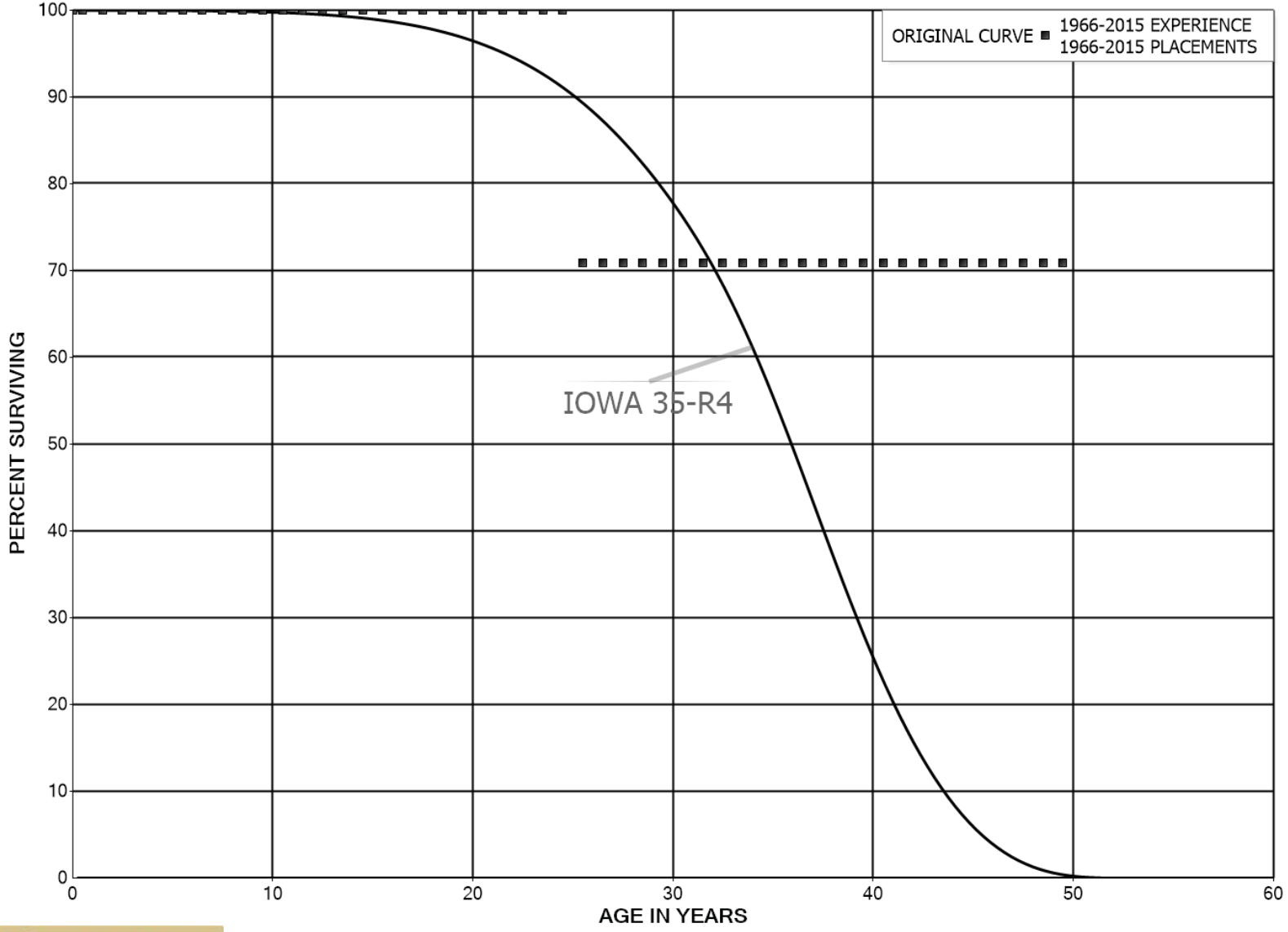
ACCOUNT S15 - STRUCTURAL SUPPORTS (WOOD OR STEEL)

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 1,186,025 | | 0.0000 | 1.0000 | 92.95 |
| 40.5 | 1,096,654 | | 0.0000 | 1.0000 | 92.95 |
| 41.5 | 1,055,841 | | 0.0000 | 1.0000 | 92.95 |
| 42.5 | 1,055,841 | | 0.0000 | 1.0000 | 92.95 |
| 43.5 | 1,055,841 | 49,499 | 0.0469 | 0.9531 | 92.95 |
| 44.5 | 1,002,463 | | 0.0000 | 1.0000 | 88.59 |
| 45.5 | 377,439 | | 0.0000 | 1.0000 | 88.59 |
| 46.5 | 377,439 | | 0.0000 | 1.0000 | 88.59 |
| 47.5 | 259,173 | 45,607 | 0.1760 | 0.8240 | 88.59 |
| 48.5 | | | | | 73.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S17 - SUMP SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S17 - SUMP SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 725,064 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 296,458 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 296,458 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 296,458 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 296,458 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 296,458 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 296,458 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 220,838 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 220,838 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 220,838 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 220,838 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 220,838 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 220,838 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 220,838 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 220,838 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 220,838 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 220,838 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 197,983 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 197,983 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 197,983 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 197,983 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 197,983 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 197,983 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 197,983 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 197,983 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 197,983 | 57,819 | 0.2920 | 0.7080 | 100.00 |
| 25.5 | 140,164 | | 0.0000 | 1.0000 | 70.80 |
| 26.5 | 140,164 | | 0.0000 | 1.0000 | 70.80 |
| 27.5 | 118,404 | | 0.0000 | 1.0000 | 70.80 |
| 28.5 | 118,404 | | 0.0000 | 1.0000 | 70.80 |
| 29.5 | 118,404 | | 0.0000 | 1.0000 | 70.80 |
| 30.5 | 116,978 | | 0.0000 | 1.0000 | 70.80 |
| 31.5 | 116,978 | | 0.0000 | 1.0000 | 70.80 |
| 32.5 | 116,978 | | 0.0000 | 1.0000 | 70.80 |
| 33.5 | 116,978 | | 0.0000 | 1.0000 | 70.80 |
| 34.5 | 116,978 | | 0.0000 | 1.0000 | 70.80 |
| 35.5 | 116,978 | | 0.0000 | 1.0000 | 70.80 |
| 36.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 37.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 38.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |

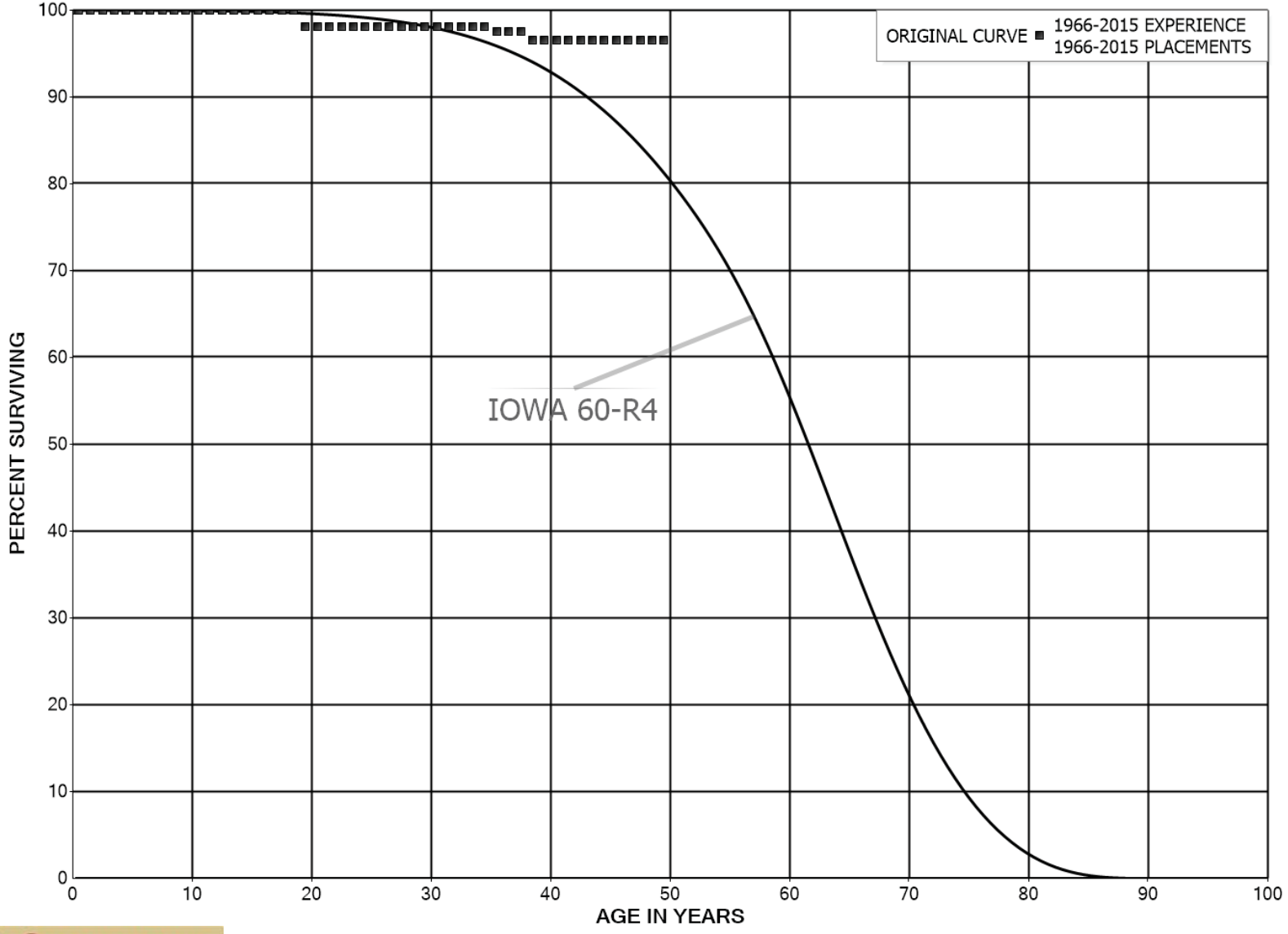
NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S17 - SUMP SYSTEMS

ORIGINAL LIFE TABLE, CONT.

| PLACEMENT BAND 1966-2015 | | | EXPERIENCE BAND 1966-2015 | | |
|---|---|---|---|---|---|
| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
| 39.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 40.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 41.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 42.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 43.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 44.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 45.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 46.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 47.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 48.5 | 62,921 | | 0.0000 | 1.0000 | 70.80 |
| 49.5 | | | | | 70.80 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S18 - SURGE SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S18 - SURGE SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 7,113,998 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 5,851,323 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 4,354,373 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 4,054,722 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 4,054,722 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 4,054,722 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 4,054,722 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 4,054,722 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 4,054,722 | 79,504 | 0.0196 | 0.9804 | 100.00 |
| 19.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 20.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 21.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 22.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 23.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 24.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 25.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 26.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 27.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 28.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 29.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 30.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 31.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 32.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 33.5 | 3,975,218 | | 0.0000 | 1.0000 | 98.04 |
| 34.5 | 3,975,218 | 20,116 | 0.0051 | 0.9949 | 98.04 |
| 35.5 | 3,955,102 | | 0.0000 | 1.0000 | 97.54 |
| 36.5 | 3,955,102 | | 0.0000 | 1.0000 | 97.54 |
| 37.5 | 3,955,102 | 40,232 | 0.0102 | 0.9898 | 97.54 |
| 38.5 | 3,914,870 | | 0.0000 | 1.0000 | 96.55 |

NEWFOUNDLAND AND LABRADOR HYDRO

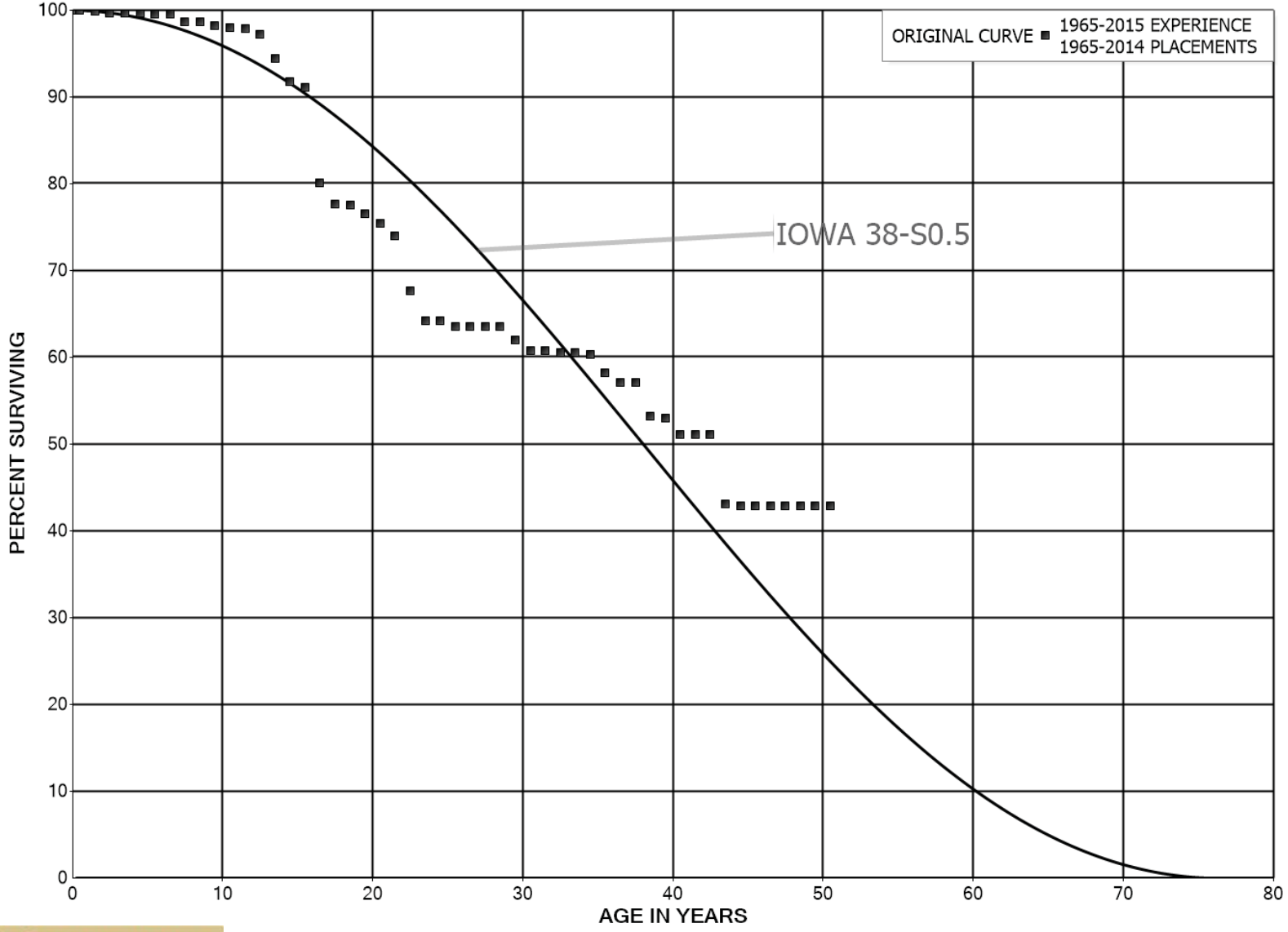
ACCOUNT S18 - SURGE SYSTEMS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 3,914,870 | | 0.0000 | 1.0000 | 96.55 |
| 40.5 | 3,914,870 | | 0.0000 | 1.0000 | 96.55 |
| 41.5 | 3,914,870 | | 0.0000 | 1.0000 | 96.55 |
| 42.5 | 3,914,870 | | 0.0000 | 1.0000 | 96.55 |
| 43.5 | 3,914,870 | | 0.0000 | 1.0000 | 96.55 |
| 44.5 | 3,914,870 | | 0.0000 | 1.0000 | 96.55 |
| 45.5 | 3,914,870 | | 0.0000 | 1.0000 | 96.55 |
| 46.5 | 3,914,870 | | 0.0000 | 1.0000 | 96.55 |
| 47.5 | 3,914,870 | 193 | 0.0000 | 1.0000 | 96.55 |
| 48.5 | 1,579,908 | 1,063 | 0.0007 | 0.9993 | 96.55 |
| 49.5 | | | | | 96.48 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S19 - STATION SWITCHING
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S19 - STATION SWITCHING

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2014 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 14,987,536 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 14,987,536 | 30,076 | 0.0020 | 0.9980 | 100.00 |
| 1.5 | 13,544,458 | 30,286 | 0.0022 | 0.9978 | 99.80 |
| 2.5 | 13,389,022 | | 0.0000 | 1.0000 | 99.58 |
| 3.5 | 13,328,869 | | 0.0000 | 1.0000 | 99.58 |
| 4.5 | 12,879,443 | 11,835 | 0.0009 | 0.9991 | 99.58 |
| 5.5 | 12,867,607 | 3,666 | 0.0003 | 0.9997 | 99.48 |
| 6.5 | 12,863,942 | 112,047 | 0.0087 | 0.9913 | 99.46 |
| 7.5 | 11,847,988 | | 0.0000 | 1.0000 | 98.59 |
| 8.5 | 11,460,837 | 45,998 | 0.0040 | 0.9960 | 98.59 |
| 9.5 | 11,271,119 | 28,935 | 0.0026 | 0.9974 | 98.19 |
| 10.5 | 10,988,593 | 10,235 | 0.0009 | 0.9991 | 97.94 |
| 11.5 | 10,969,670 | 73,083 | 0.0067 | 0.9933 | 97.85 |
| 12.5 | 10,295,143 | 296,280 | 0.0288 | 0.9712 | 97.20 |
| 13.5 | 9,183,387 | 260,263 | 0.0283 | 0.9717 | 94.40 |
| 14.5 | 8,056,983 | 58,587 | 0.0073 | 0.9927 | 91.73 |
| 15.5 | 7,587,324 | 915,270 | 0.1206 | 0.8794 | 91.06 |
| 16.5 | 6,641,282 | 203,143 | 0.0306 | 0.9694 | 80.07 |
| 17.5 | 6,213,224 | 13,631 | 0.0022 | 0.9978 | 77.63 |
| 18.5 | 5,699,538 | 71,055 | 0.0125 | 0.9875 | 77.46 |
| 19.5 | 5,482,134 | 75,203 | 0.0137 | 0.9863 | 76.49 |
| 20.5 | 5,372,925 | 108,818 | 0.0203 | 0.9797 | 75.44 |
| 21.5 | 4,954,681 | 421,338 | 0.0850 | 0.9150 | 73.91 |
| 22.5 | 4,533,343 | 232,664 | 0.0513 | 0.9487 | 67.63 |
| 23.5 | 4,054,060 | | 0.0000 | 1.0000 | 64.16 |
| 24.5 | 3,987,759 | 43,462 | 0.0109 | 0.9891 | 64.16 |
| 25.5 | 3,879,906 | | 0.0000 | 1.0000 | 63.46 |
| 26.5 | 3,754,538 | | 0.0000 | 1.0000 | 63.46 |
| 27.5 | 3,730,230 | | 0.0000 | 1.0000 | 63.46 |
| 28.5 | 3,679,692 | 85,425 | 0.0232 | 0.9768 | 63.46 |
| 29.5 | 3,559,218 | 70,855 | 0.0199 | 0.9801 | 61.98 |
| 30.5 | 1,027,242 | | 0.0000 | 1.0000 | 60.75 |
| 31.5 | 918,837 | 4,141 | 0.0045 | 0.9955 | 60.75 |
| 32.5 | 914,696 | | 0.0000 | 1.0000 | 60.48 |
| 33.5 | 791,491 | 1,920 | 0.0024 | 0.9976 | 60.48 |
| 34.5 | 724,263 | 25,334 | 0.0350 | 0.9650 | 60.33 |
| 35.5 | 442,403 | 9,003 | 0.0204 | 0.9796 | 58.22 |
| 36.5 | 433,400 | | 0.0000 | 1.0000 | 57.03 |
| 37.5 | 433,400 | 29,596 | 0.0683 | 0.9317 | 57.03 |
| 38.5 | 403,804 | 1,054 | 0.0026 | 0.9974 | 53.14 |

NEWFOUNDLAND AND LABRADOR HYDRO

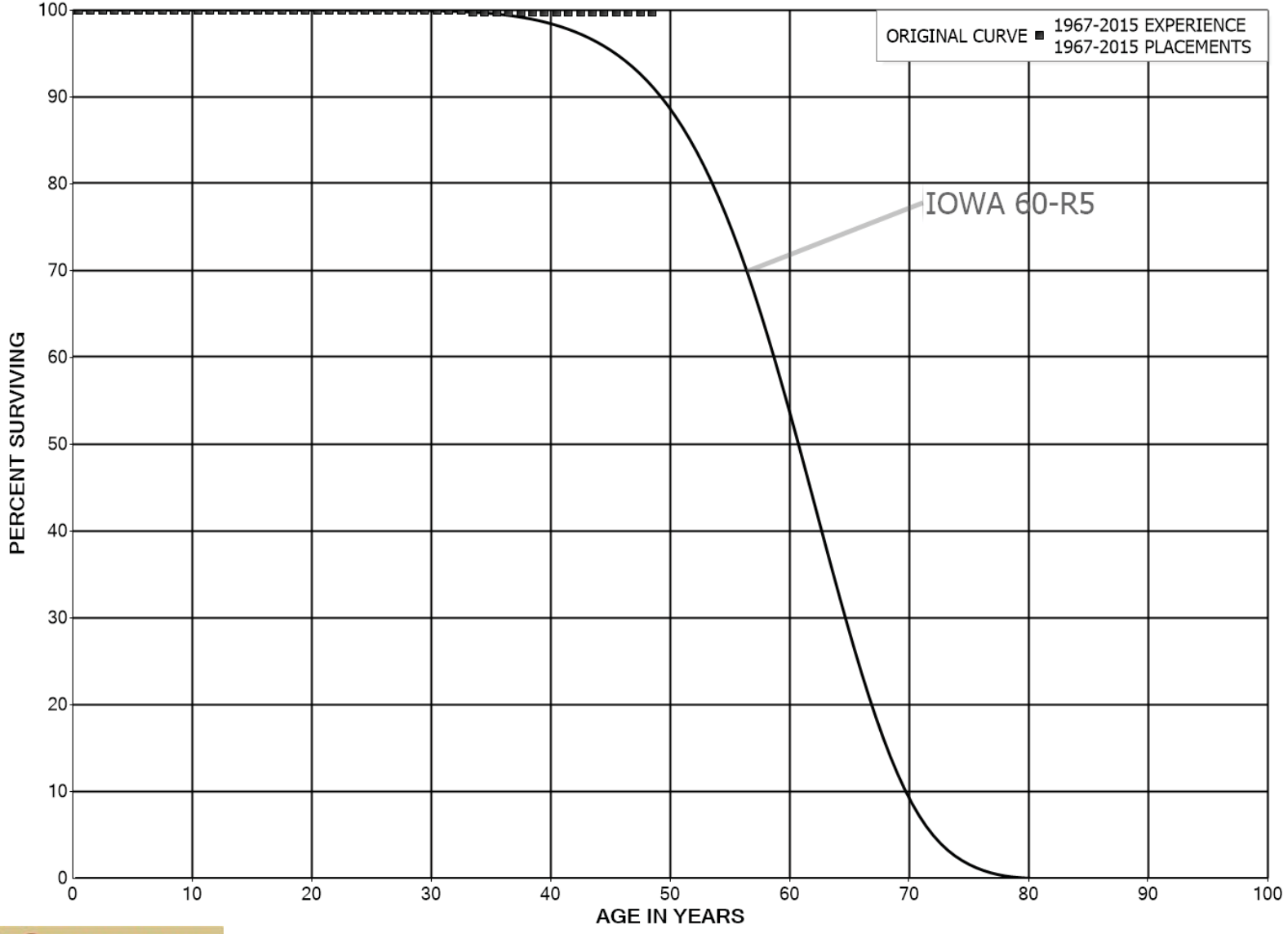
ACCOUNT S19 - STATION SWITCHING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2014 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 402,750 | 14,301 | 0.0355 | 0.9645 | 53.00 |
| 40.5 | 388,449 | | 0.0000 | 1.0000 | 51.12 |
| 41.5 | 388,449 | | 0.0000 | 1.0000 | 51.12 |
| 42.5 | 308,438 | 48,663 | 0.1578 | 0.8422 | 51.12 |
| 43.5 | 259,776 | 1,335 | 0.0051 | 0.9949 | 43.05 |
| 44.5 | 258,441 | | 0.0000 | 1.0000 | 42.83 |
| 45.5 | 257,441 | | 0.0000 | 1.0000 | 42.83 |
| 46.5 | 257,441 | | 0.0000 | 1.0000 | 42.83 |
| 47.5 | 95,999 | | 0.0000 | 1.0000 | 42.83 |
| 48.5 | 95,999 | | 0.0000 | 1.0000 | 42.83 |
| 49.5 | 95,999 | | 0.0000 | 1.0000 | 42.83 |
| 50.5 | | | | | 42.83 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT S20 - SWITCHING SYSTEMS - L.V.
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S20 - SWITCHING SYSTEMS - L.V.

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 2,306,330 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 1,960,879 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 1,811,180 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 1,811,180 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 1,809,042 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 1,795,661 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 1,795,661 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 1,795,661 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 1,795,661 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 765,324 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 765,324 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 707,369 | 1,722 | 0.0024 | 0.9976 | 100.00 |
| 33.5 | 364,335 | | 0.0000 | 1.0000 | 99.76 |
| 34.5 | 364,335 | | 0.0000 | 1.0000 | 99.76 |
| 35.5 | 71,442 | | 0.0000 | 1.0000 | 99.76 |
| 36.5 | 71,442 | | 0.0000 | 1.0000 | 99.76 |
| 37.5 | 28,493 | | 0.0000 | 1.0000 | 99.76 |
| 38.5 | 28,493 | | 0.0000 | 1.0000 | 99.76 |

NEWFOUNDLAND AND LABRADOR HYDRO

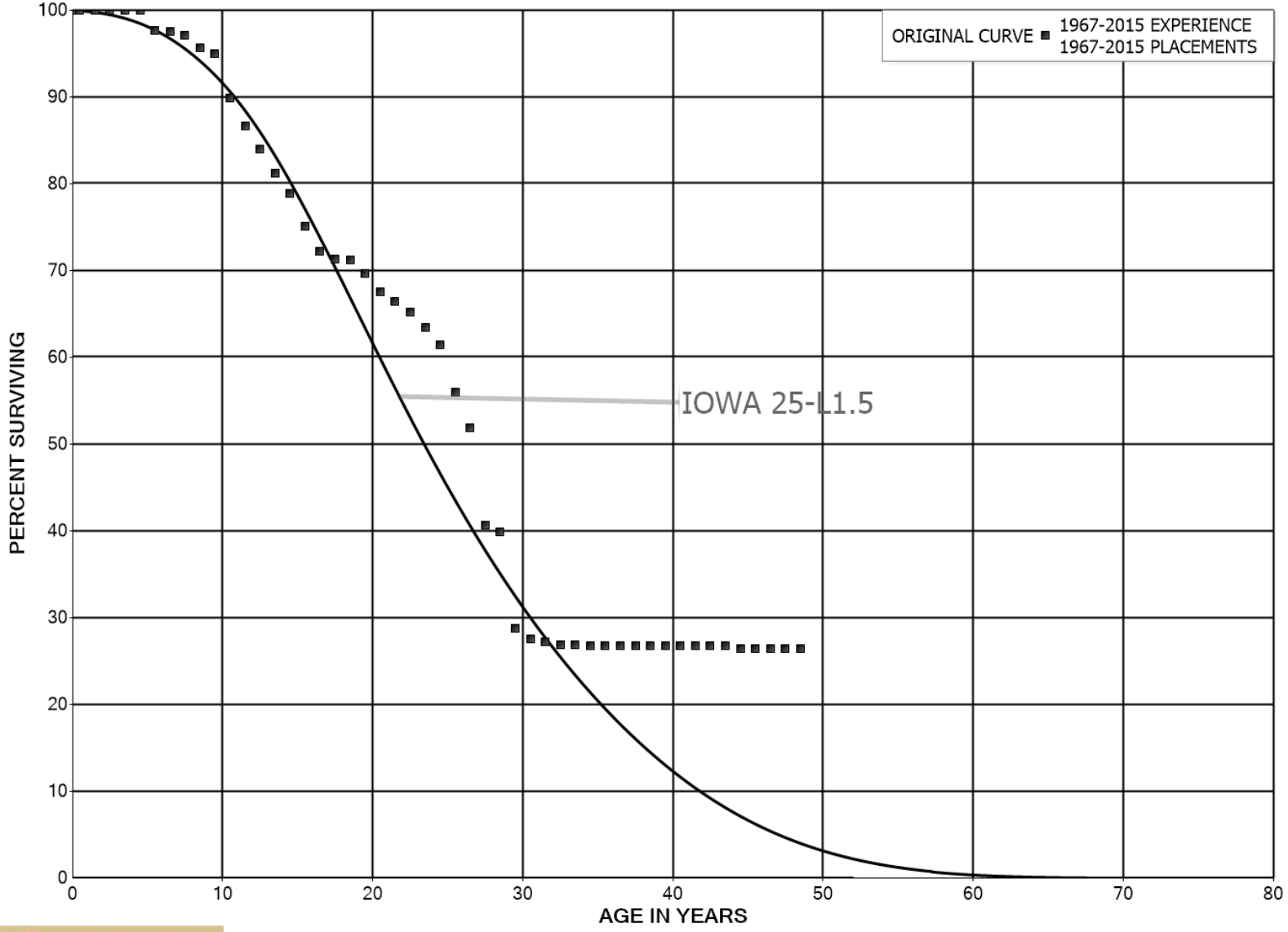
ACCOUNT S20 - SWITCHING SYSTEMS - L.V.

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 28,493 | | 0.0000 | 1.0000 | 99.76 |
| 40.5 | 28,493 | | 0.0000 | 1.0000 | 99.76 |
| 41.5 | 28,493 | | 0.0000 | 1.0000 | 99.76 |
| 42.5 | 28,493 | | 0.0000 | 1.0000 | 99.76 |
| 43.5 | 28,493 | | 0.0000 | 1.0000 | 99.76 |
| 44.5 | 28,493 | | 0.0000 | 1.0000 | 99.76 |
| 45.5 | 23,423 | | 0.0000 | 1.0000 | 99.76 |
| 46.5 | 11,423 | | 0.0000 | 1.0000 | 99.76 |
| 47.5 | 11,423 | | 0.0000 | 1.0000 | 99.76 |
| 48.5 | | | | | 99.76 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT T01 - TELECONTROL SYSTEM
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T01 - TELECONTROL SYSTEM

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 19,199,483 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 18,510,064 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 18,310,634 | 1,631 | 0.0001 | 0.9999 | 100.00 |
| 2.5 | 18,000,446 | 11,656 | 0.0006 | 0.9994 | 99.99 |
| 3.5 | 17,202,985 | | 0.0000 | 1.0000 | 99.93 |
| 4.5 | 15,075,735 | 352,364 | 0.0234 | 0.9766 | 99.93 |
| 5.5 | 13,947,912 | 4,840 | 0.0003 | 0.9997 | 97.59 |
| 6.5 | 13,789,637 | 66,036 | 0.0048 | 0.9952 | 97.56 |
| 7.5 | 13,042,480 | 194,359 | 0.0149 | 0.9851 | 97.09 |
| 8.5 | 12,692,265 | 88,720 | 0.0070 | 0.9930 | 95.64 |
| 9.5 | 12,486,781 | 673,815 | 0.0540 | 0.9460 | 94.97 |
| 10.5 | 11,743,989 | 420,613 | 0.0358 | 0.9642 | 89.85 |
| 11.5 | 11,138,133 | 348,807 | 0.0313 | 0.9687 | 86.63 |
| 12.5 | 9,517,145 | 315,280 | 0.0331 | 0.9669 | 83.92 |
| 13.5 | 8,914,288 | 249,255 | 0.0280 | 0.9720 | 81.14 |
| 14.5 | 8,035,109 | 391,488 | 0.0487 | 0.9513 | 78.87 |
| 15.5 | 7,410,979 | 287,039 | 0.0387 | 0.9613 | 75.03 |
| 16.5 | 6,465,242 | 70,023 | 0.0108 | 0.9892 | 72.12 |
| 17.5 | 6,274,301 | 10,860 | 0.0017 | 0.9983 | 71.34 |
| 18.5 | 6,033,283 | 136,290 | 0.0226 | 0.9774 | 71.22 |
| 19.5 | 5,746,169 | 174,088 | 0.0303 | 0.9697 | 69.61 |
| 20.5 | 5,232,026 | 86,805 | 0.0166 | 0.9834 | 67.50 |
| 21.5 | 5,145,221 | 91,571 | 0.0178 | 0.9822 | 66.38 |
| 22.5 | 5,044,135 | 135,495 | 0.0269 | 0.9731 | 65.20 |
| 23.5 | 4,698,390 | 152,797 | 0.0325 | 0.9675 | 63.45 |
| 24.5 | 4,536,500 | 401,226 | 0.0884 | 0.9116 | 61.38 |
| 25.5 | 4,067,439 | 297,921 | 0.0732 | 0.9268 | 55.95 |
| 26.5 | 3,744,346 | 815,621 | 0.2178 | 0.7822 | 51.86 |
| 27.5 | 2,916,250 | 52,918 | 0.0181 | 0.9819 | 40.56 |
| 28.5 | 2,830,872 | 790,317 | 0.2792 | 0.7208 | 39.82 |
| 29.5 | 2,040,555 | 85,767 | 0.0420 | 0.9580 | 28.71 |
| 30.5 | 1,829,540 | 18,823 | 0.0103 | 0.9897 | 27.50 |
| 31.5 | 1,797,594 | 22,110 | 0.0123 | 0.9877 | 27.22 |
| 32.5 | 1,775,483 | 4,829 | 0.0027 | 0.9973 | 26.88 |
| 33.5 | 1,745,127 | 8,730 | 0.0050 | 0.9950 | 26.81 |
| 34.5 | 1,736,397 | | 0.0000 | 1.0000 | 26.67 |
| 35.5 | 1,057,081 | | 0.0000 | 1.0000 | 26.67 |
| 36.5 | 1,057,081 | | 0.0000 | 1.0000 | 26.67 |
| 37.5 | 1,028,979 | | 0.0000 | 1.0000 | 26.67 |
| 38.5 | 985,184 | | 0.0000 | 1.0000 | 26.67 |

NEWFOUNDLAND AND LABRADOR HYDRO

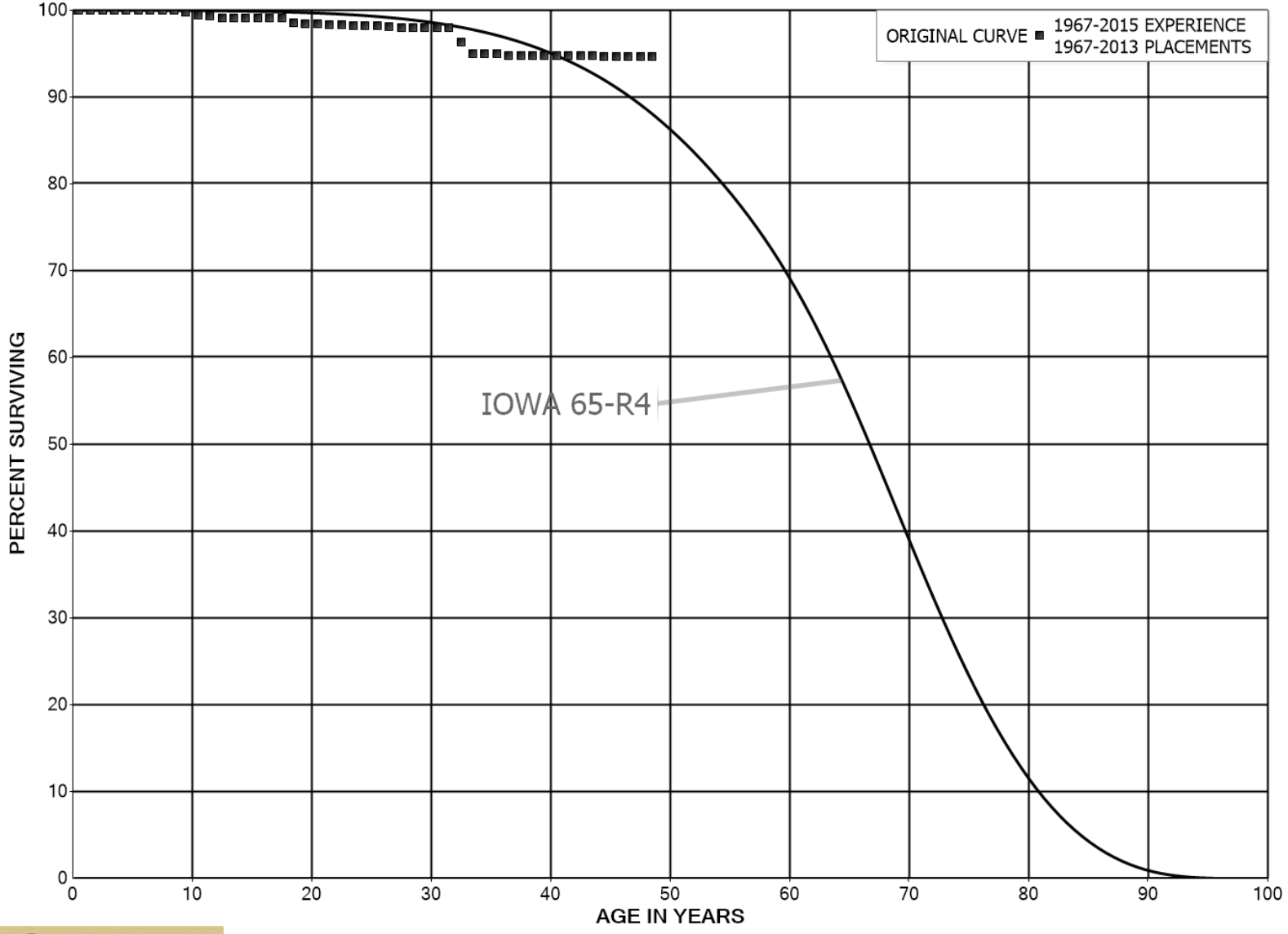
ACCOUNT T01 - TELECONTROL SYSTEM

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 977,989 | | 0.0000 | 1.0000 | 26.67 |
| 40.5 | 939,761 | | 0.0000 | 1.0000 | 26.67 |
| 41.5 | 800,037 | | 0.0000 | 1.0000 | 26.67 |
| 42.5 | 800,037 | | 0.0000 | 1.0000 | 26.67 |
| 43.5 | 800,037 | 8,113 | 0.0101 | 0.9899 | 26.67 |
| 44.5 | 791,925 | | 0.0000 | 1.0000 | 26.40 |
| 45.5 | 305,809 | | 0.0000 | 1.0000 | 26.40 |
| 46.5 | 305,809 | | 0.0000 | 1.0000 | 26.40 |
| 47.5 | 155,517 | | 0.0000 | 1.0000 | 26.40 |
| 48.5 | | | | | 26.40 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT T04 - TOWERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T04 - TOWERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2013 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 79,600,586 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 79,600,586 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 79,600,586 | 7,600 | 0.0001 | 0.9999 | 100.00 |
| 2.5 | 79,567,365 | | 0.0000 | 1.0000 | 99.99 |
| 3.5 | 74,039,634 | | 0.0000 | 1.0000 | 99.99 |
| 4.5 | 73,866,151 | | 0.0000 | 1.0000 | 99.99 |
| 5.5 | 73,763,472 | | 0.0000 | 1.0000 | 99.99 |
| 6.5 | 73,763,472 | 2,280 | 0.0000 | 1.0000 | 99.99 |
| 7.5 | 73,761,192 | | 0.0000 | 1.0000 | 99.99 |
| 8.5 | 72,263,060 | 170,680 | 0.0024 | 0.9976 | 99.99 |
| 9.5 | 72,092,380 | 232,649 | 0.0032 | 0.9968 | 99.75 |
| 10.5 | 71,859,731 | 121,423 | 0.0017 | 0.9983 | 99.43 |
| 11.5 | 69,685,171 | 164,133 | 0.0024 | 0.9976 | 99.26 |
| 12.5 | 65,326,035 | | 0.0000 | 1.0000 | 99.03 |
| 13.5 | 57,728,762 | | 0.0000 | 1.0000 | 99.03 |
| 14.5 | 53,667,989 | | 0.0000 | 1.0000 | 99.03 |
| 15.5 | 46,005,128 | | 0.0000 | 1.0000 | 99.03 |
| 16.5 | 45,193,882 | | 0.0000 | 1.0000 | 99.03 |
| 17.5 | 45,193,882 | 236,129 | 0.0052 | 0.9948 | 99.03 |
| 18.5 | 44,957,753 | 44,232 | 0.0010 | 0.9990 | 98.51 |
| 19.5 | 44,884,788 | | 0.0000 | 1.0000 | 98.41 |
| 20.5 | 44,884,788 | 81,674 | 0.0018 | 0.9982 | 98.41 |
| 21.5 | 44,803,115 | 959 | 0.0000 | 1.0000 | 98.23 |
| 22.5 | 44,670,344 | 3,412 | 0.0001 | 0.9999 | 98.23 |
| 23.5 | 44,666,932 | 30,006 | 0.0007 | 0.9993 | 98.22 |
| 24.5 | 43,190,983 | 6,005 | 0.0001 | 0.9999 | 98.16 |
| 25.5 | 39,217,234 | 17,827 | 0.0005 | 0.9995 | 98.14 |
| 26.5 | 38,506,736 | 38,423 | 0.0010 | 0.9990 | 98.10 |
| 27.5 | 37,963,098 | | 0.0000 | 1.0000 | 98.00 |
| 28.5 | 37,963,098 | | 0.0000 | 1.0000 | 98.00 |
| 29.5 | 37,963,098 | 43,091 | 0.0011 | 0.9989 | 98.00 |
| 30.5 | 23,010,552 | | 0.0000 | 1.0000 | 97.89 |
| 31.5 | 22,684,833 | 375,208 | 0.0165 | 0.9835 | 97.89 |
| 32.5 | 17,081,479 | 227,210 | 0.0133 | 0.9867 | 96.27 |
| 33.5 | 16,826,528 | | 0.0000 | 1.0000 | 94.99 |
| 34.5 | 16,693,350 | 7,750 | 0.0005 | 0.9995 | 94.99 |
| 35.5 | 16,685,600 | 34,169 | 0.0020 | 0.9980 | 94.95 |
| 36.5 | 16,651,431 | | 0.0000 | 1.0000 | 94.75 |
| 37.5 | 16,651,431 | | 0.0000 | 1.0000 | 94.75 |
| 38.5 | 12,505,973 | | 0.0000 | 1.0000 | 94.75 |

NEWFOUNDLAND AND LABRADOR HYDRO

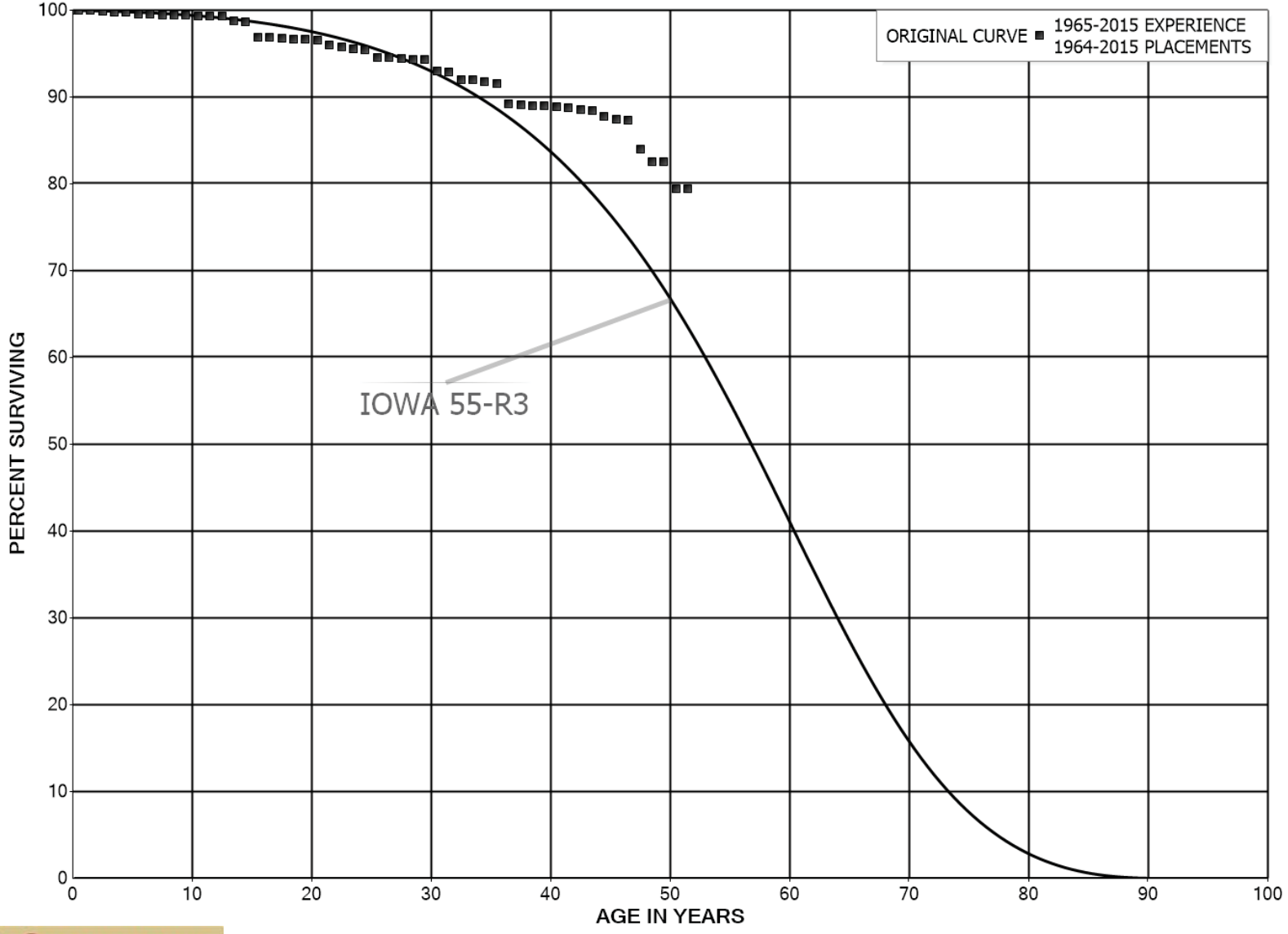
ACCOUNT T04 - TOWERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2013 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 12,438,050 | | 0.0000 | 1.0000 | 94.75 |
| 40.5 | 12,438,050 | | 0.0000 | 1.0000 | 94.75 |
| 41.5 | 12,110,026 | | 0.0000 | 1.0000 | 94.75 |
| 42.5 | 12,110,026 | | 0.0000 | 1.0000 | 94.75 |
| 43.5 | 12,110,026 | 16,304 | 0.0013 | 0.9987 | 94.75 |
| 44.5 | 12,093,722 | | 0.0000 | 1.0000 | 94.63 |
| 45.5 | 11,446,353 | | 0.0000 | 1.0000 | 94.63 |
| 46.5 | 11,446,353 | | 0.0000 | 1.0000 | 94.63 |
| 47.5 | 7,774,613 | | 0.0000 | 1.0000 | 94.63 |
| 48.5 | | | | | 94.63 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT T05 - TRANSFORMERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T05 - TRANSFORMERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1964-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 95,857,145 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 88,122,308 | 44,665 | 0.0005 | 0.9995 | 100.00 |
| 1.5 | 87,306,677 | 85,098 | 0.0010 | 0.9990 | 99.95 |
| 2.5 | 83,964,424 | 86,565 | 0.0010 | 0.9990 | 99.85 |
| 3.5 | 79,640,935 | 2,646 | 0.0000 | 1.0000 | 99.75 |
| 4.5 | 78,308,268 | 151,515 | 0.0019 | 0.9981 | 99.75 |
| 5.5 | 77,048,931 | 63,822 | 0.0008 | 0.9992 | 99.55 |
| 6.5 | 73,335,629 | 76,919 | 0.0010 | 0.9990 | 99.47 |
| 7.5 | 73,162,681 | 2,100 | 0.0000 | 1.0000 | 99.37 |
| 8.5 | 71,487,233 | | 0.0000 | 1.0000 | 99.36 |
| 9.5 | 71,305,019 | 32,828 | 0.0005 | 0.9995 | 99.36 |
| 10.5 | 70,725,698 | 7,335 | 0.0001 | 0.9999 | 99.32 |
| 11.5 | 69,555,115 | 17,569 | 0.0003 | 0.9997 | 99.31 |
| 12.5 | 68,284,510 | 399,150 | 0.0058 | 0.9942 | 99.28 |
| 13.5 | 65,467,625 | 68,388 | 0.0010 | 0.9990 | 98.70 |
| 14.5 | 65,302,912 | 1,159,208 | 0.0178 | 0.9822 | 98.60 |
| 15.5 | 63,964,689 | 22,254 | 0.0003 | 0.9997 | 96.85 |
| 16.5 | 63,746,431 | 45,664 | 0.0007 | 0.9993 | 96.81 |
| 17.5 | 61,628,637 | 68,254 | 0.0011 | 0.9989 | 96.75 |
| 18.5 | 61,455,645 | 28,619 | 0.0005 | 0.9995 | 96.64 |
| 19.5 | 59,296,221 | 74,827 | 0.0013 | 0.9987 | 96.59 |
| 20.5 | 56,400,128 | 274,922 | 0.0049 | 0.9951 | 96.47 |
| 21.5 | 55,900,930 | 134,546 | 0.0024 | 0.9976 | 96.00 |
| 22.5 | 55,128,410 | 169,465 | 0.0031 | 0.9969 | 95.77 |
| 23.5 | 54,501,695 | 58,870 | 0.0011 | 0.9989 | 95.48 |
| 24.5 | 53,955,513 | 462,135 | 0.0086 | 0.9914 | 95.37 |
| 25.5 | 50,310,923 | 38,486 | 0.0008 | 0.9992 | 94.56 |
| 26.5 | 45,550,027 | 59,609 | 0.0013 | 0.9987 | 94.48 |
| 27.5 | 43,779,727 | 52,574 | 0.0012 | 0.9988 | 94.36 |
| 28.5 | 43,335,243 | 6,946 | 0.0002 | 0.9998 | 94.25 |
| 29.5 | 41,977,199 | 558,539 | 0.0133 | 0.9867 | 94.23 |
| 30.5 | 38,116,191 | 76,284 | 0.0020 | 0.9980 | 92.98 |
| 31.5 | 37,977,943 | 332,661 | 0.0088 | 0.9912 | 92.79 |
| 32.5 | 37,344,865 | 34,653 | 0.0009 | 0.9991 | 91.98 |
| 33.5 | 36,287,993 | 77,705 | 0.0021 | 0.9979 | 91.89 |
| 34.5 | 35,054,159 | 80,185 | 0.0023 | 0.9977 | 91.70 |
| 35.5 | 31,704,163 | 794,690 | 0.0251 | 0.9749 | 91.49 |
| 36.5 | 30,739,599 | 44,523 | 0.0014 | 0.9986 | 89.19 |
| 37.5 | 25,293,691 | 17,718 | 0.0007 | 0.9993 | 89.06 |
| 38.5 | 21,654,288 | 19,455 | 0.0009 | 0.9991 | 89.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

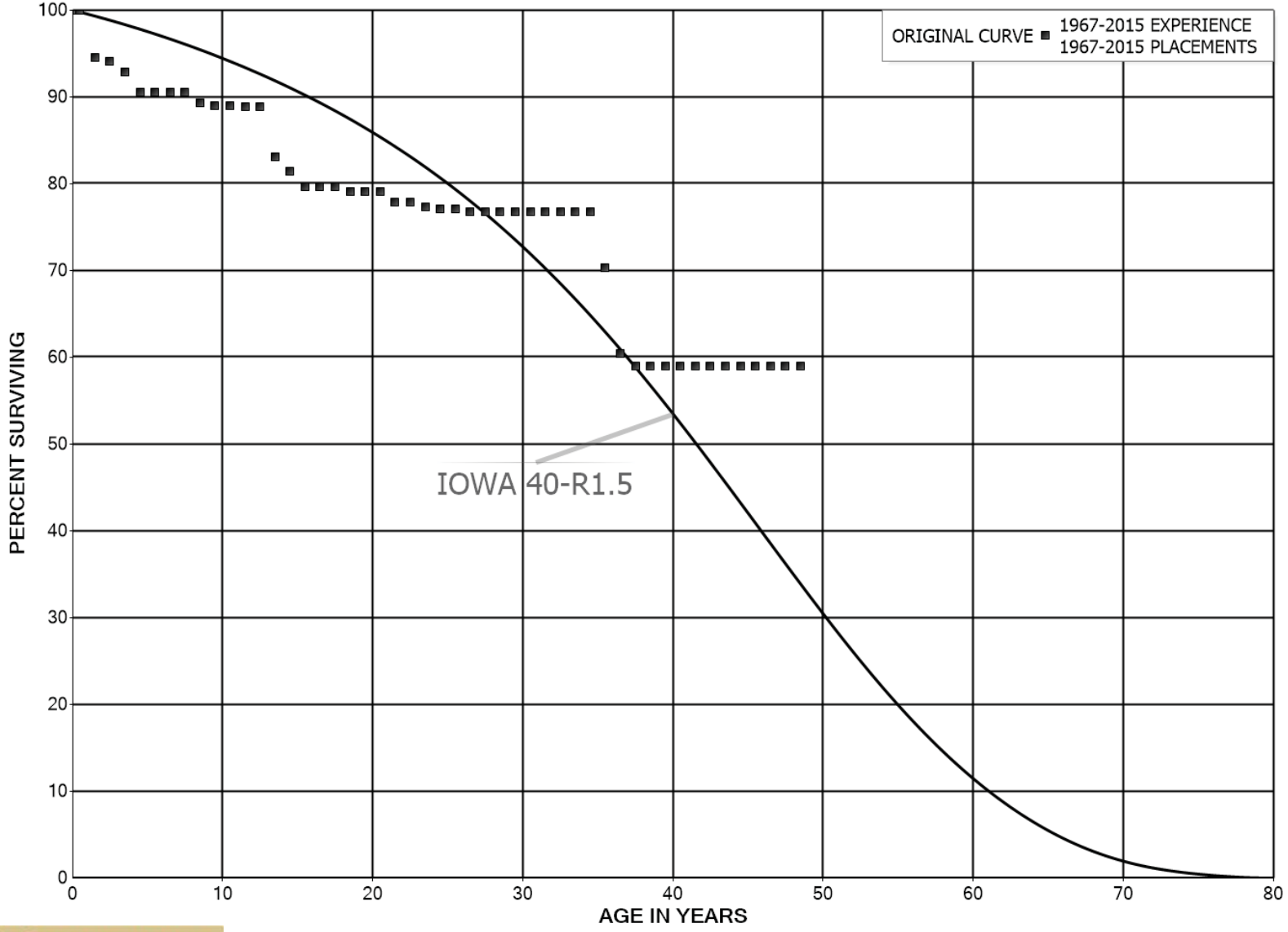
ACCOUNT T05 - TRANSFORMERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1964-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 21,367,880 | 25,149 | 0.0012 | 0.9988 | 88.92 |
| 40.5 | 21,012,271 | 20,930 | 0.0010 | 0.9990 | 88.82 |
| 41.5 | 19,792,714 | 38,836 | 0.0020 | 0.9980 | 88.73 |
| 42.5 | 19,723,384 | 26,747 | 0.0014 | 0.9986 | 88.55 |
| 43.5 | 18,859,494 | 141,679 | 0.0075 | 0.9925 | 88.43 |
| 44.5 | 16,378,658 | 62,522 | 0.0038 | 0.9962 | 87.77 |
| 45.5 | 8,134,007 | 10,840 | 0.0013 | 0.9987 | 87.44 |
| 46.5 | 6,541,534 | 255,505 | 0.0391 | 0.9609 | 87.32 |
| 47.5 | 5,198,559 | 88,284 | 0.0170 | 0.9830 | 83.91 |
| 48.5 | 2,559,705 | | 0.0000 | 1.0000 | 82.48 |
| 49.5 | 2,264,269 | 83,535 | 0.0369 | 0.9631 | 82.48 |
| 50.5 | 10,236 | | 0.0000 | 1.0000 | 79.44 |
| 51.5 | | | | | 79.44 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT T06 - TRANSFORMERS - PAD MOUNT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T06 - TRANSFORMERS - PAD MOUNT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 19,339,323 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 19,025,934 | 1,037,385 | 0.0545 | 0.9455 | 100.00 |
| 1.5 | 5,438,744 | 30,758 | 0.0057 | 0.9943 | 94.55 |
| 2.5 | 5,236,512 | 67,945 | 0.0130 | 0.9870 | 94.01 |
| 3.5 | 3,461,719 | 85,606 | 0.0247 | 0.9753 | 92.79 |
| 4.5 | 3,222,545 | | 0.0000 | 1.0000 | 90.50 |
| 5.5 | 3,042,969 | | 0.0000 | 1.0000 | 90.50 |
| 6.5 | 2,910,912 | | 0.0000 | 1.0000 | 90.50 |
| 7.5 | 2,600,334 | 35,827 | 0.0138 | 0.9862 | 90.50 |
| 8.5 | 2,466,035 | 8,554 | 0.0035 | 0.9965 | 89.25 |
| 9.5 | 2,358,118 | | 0.0000 | 1.0000 | 88.94 |
| 10.5 | 2,291,822 | 1,547 | 0.0007 | 0.9993 | 88.94 |
| 11.5 | 2,220,050 | | 0.0000 | 1.0000 | 88.88 |
| 12.5 | 2,189,344 | 143,918 | 0.0657 | 0.9343 | 88.88 |
| 13.5 | 1,952,037 | 38,858 | 0.0199 | 0.9801 | 83.04 |
| 14.5 | 1,557,037 | 34,478 | 0.0221 | 0.9779 | 81.39 |
| 15.5 | 1,480,587 | | 0.0000 | 1.0000 | 79.58 |
| 16.5 | 1,434,899 | | 0.0000 | 1.0000 | 79.58 |
| 17.5 | 1,434,157 | 8,724 | 0.0061 | 0.9939 | 79.58 |
| 18.5 | 1,353,006 | | 0.0000 | 1.0000 | 79.10 |
| 19.5 | 1,196,585 | | 0.0000 | 1.0000 | 79.10 |
| 20.5 | 1,186,320 | 18,186 | 0.0153 | 0.9847 | 79.10 |
| 21.5 | 1,028,887 | | 0.0000 | 1.0000 | 77.89 |
| 22.5 | 995,883 | 7,468 | 0.0075 | 0.9925 | 77.89 |
| 23.5 | 895,282 | 2,527 | 0.0028 | 0.9972 | 77.30 |
| 24.5 | 810,675 | | 0.0000 | 1.0000 | 77.08 |
| 25.5 | 810,675 | 4,037 | 0.0050 | 0.9950 | 77.08 |
| 26.5 | 742,670 | | 0.0000 | 1.0000 | 76.70 |
| 27.5 | 742,670 | | 0.0000 | 1.0000 | 76.70 |
| 28.5 | 694,732 | | 0.0000 | 1.0000 | 76.70 |
| 29.5 | 694,732 | | 0.0000 | 1.0000 | 76.70 |
| 30.5 | 667,713 | | 0.0000 | 1.0000 | 76.70 |
| 31.5 | 653,479 | | 0.0000 | 1.0000 | 76.70 |
| 32.5 | 582,832 | | 0.0000 | 1.0000 | 76.70 |
| 33.5 | 455,538 | | 0.0000 | 1.0000 | 76.70 |
| 34.5 | 387,862 | 32,374 | 0.0835 | 0.9165 | 76.70 |
| 35.5 | 355,488 | 50,169 | 0.1411 | 0.8589 | 70.30 |
| 36.5 | 305,319 | 7,311 | 0.0239 | 0.9761 | 60.38 |
| 37.5 | 298,008 | | 0.0000 | 1.0000 | 58.93 |
| 38.5 | 298,008 | | 0.0000 | 1.0000 | 58.93 |

NEWFOUNDLAND AND LABRADOR HYDRO

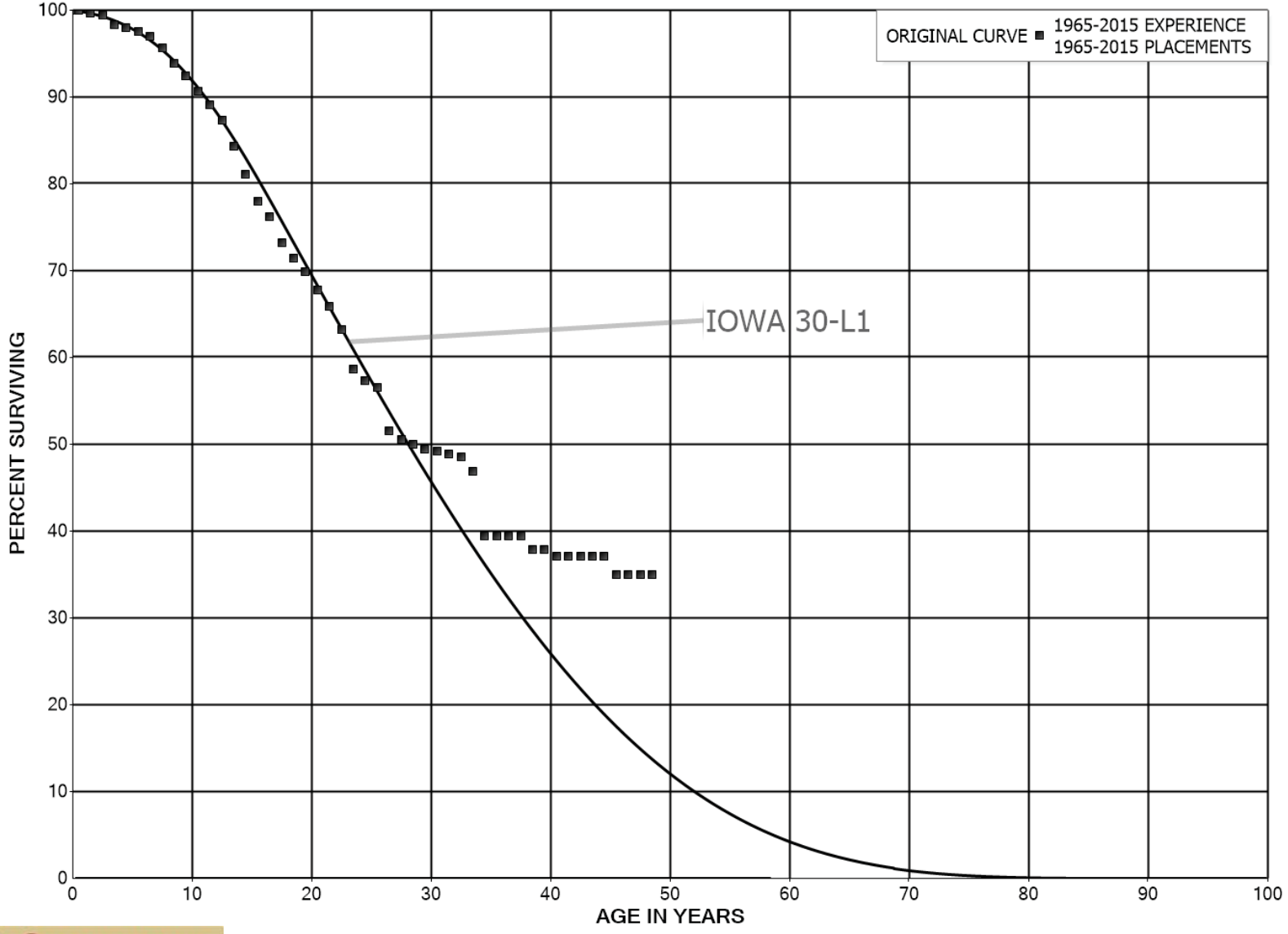
ACCOUNT T06 - TRANSFORMERS - PAD MOUNT

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 298,008 | | 0.0000 | 1.0000 | 58.93 |
| 40.5 | 298,008 | | 0.0000 | 1.0000 | 58.93 |
| 41.5 | 274,029 | | 0.0000 | 1.0000 | 58.93 |
| 42.5 | 274,029 | | 0.0000 | 1.0000 | 58.93 |
| 43.5 | 274,029 | | 0.0000 | 1.0000 | 58.93 |
| 44.5 | 274,029 | | 0.0000 | 1.0000 | 58.93 |
| 45.5 | 195,242 | | 0.0000 | 1.0000 | 58.93 |
| 46.5 | 195,242 | | 0.0000 | 1.0000 | 58.93 |
| 47.5 | 85,000 | | 0.0000 | 1.0000 | 58.93 |
| 48.5 | | | | | 58.93 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT T07 - TRANSFORMERS - POLE MOUNTED
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T07 - TRANSFORMERS - POLE MOUNTED

ORIGINAL LIFE TABLE

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 43,804,624 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 41,387,708 | 154,817 | 0.0037 | 0.9963 | 100.00 |
| 1.5 | 37,951,239 | 97,742 | 0.0026 | 0.9974 | 99.63 |
| 2.5 | 34,300,336 | 388,576 | 0.0113 | 0.9887 | 99.37 |
| 3.5 | 30,404,497 | 103,376 | 0.0034 | 0.9966 | 98.24 |
| 4.5 | 26,498,939 | 101,334 | 0.0038 | 0.9962 | 97.91 |
| 5.5 | 24,036,269 | 138,131 | 0.0057 | 0.9943 | 97.54 |
| 6.5 | 22,186,028 | 312,976 | 0.0141 | 0.9859 | 96.97 |
| 7.5 | 20,807,119 | 375,541 | 0.0180 | 0.9820 | 95.61 |
| 8.5 | 19,123,371 | 300,274 | 0.0157 | 0.9843 | 93.88 |
| 9.5 | 17,823,982 | 336,369 | 0.0189 | 0.9811 | 92.41 |
| 10.5 | 16,466,088 | 299,150 | 0.0182 | 0.9818 | 90.66 |
| 11.5 | 15,366,282 | 291,170 | 0.0189 | 0.9811 | 89.02 |
| 12.5 | 14,092,016 | 483,117 | 0.0343 | 0.9657 | 87.33 |
| 13.5 | 12,790,215 | 491,814 | 0.0385 | 0.9615 | 84.34 |
| 14.5 | 11,670,634 | 445,063 | 0.0381 | 0.9619 | 81.09 |
| 15.5 | 10,538,290 | 252,623 | 0.0240 | 0.9760 | 78.00 |
| 16.5 | 9,600,508 | 374,858 | 0.0390 | 0.9610 | 76.13 |
| 17.5 | 8,621,213 | 201,789 | 0.0234 | 0.9766 | 73.16 |
| 18.5 | 7,288,480 | 166,518 | 0.0228 | 0.9772 | 71.45 |
| 19.5 | 6,226,539 | 181,504 | 0.0292 | 0.9708 | 69.81 |
| 20.5 | 5,461,653 | 154,378 | 0.0283 | 0.9717 | 67.78 |
| 21.5 | 5,024,915 | 204,742 | 0.0407 | 0.9593 | 65.86 |
| 22.5 | 4,519,138 | 329,705 | 0.0730 | 0.9270 | 63.18 |
| 23.5 | 3,321,858 | 70,736 | 0.0213 | 0.9787 | 58.57 |
| 24.5 | 2,979,311 | 39,725 | 0.0133 | 0.9867 | 57.32 |
| 25.5 | 2,668,644 | 236,710 | 0.0887 | 0.9113 | 56.56 |
| 26.5 | 2,183,299 | 44,916 | 0.0206 | 0.9794 | 51.54 |
| 27.5 | 1,975,636 | 19,057 | 0.0096 | 0.9904 | 50.48 |
| 28.5 | 1,497,522 | 17,463 | 0.0117 | 0.9883 | 49.99 |
| 29.5 | 1,304,970 | 5,411 | 0.0041 | 0.9959 | 49.41 |
| 30.5 | 1,147,953 | 8,622 | 0.0075 | 0.9925 | 49.21 |
| 31.5 | 983,742 | 6,192 | 0.0063 | 0.9937 | 48.84 |
| 32.5 | 759,544 | 26,243 | 0.0346 | 0.9654 | 48.53 |
| 33.5 | 602,543 | 96,039 | 0.1594 | 0.8406 | 46.85 |
| 34.5 | 78,504 | | 0.0000 | 1.0000 | 39.38 |
| 35.5 | 78,504 | | 0.0000 | 1.0000 | 39.38 |
| 36.5 | 78,181 | | 0.0000 | 1.0000 | 39.38 |
| 37.5 | 67,297 | 2,708 | 0.0402 | 0.9598 | 39.38 |
| 38.5 | 64,589 | | 0.0000 | 1.0000 | 37.80 |

NEWFOUNDLAND AND LABRADOR HYDRO

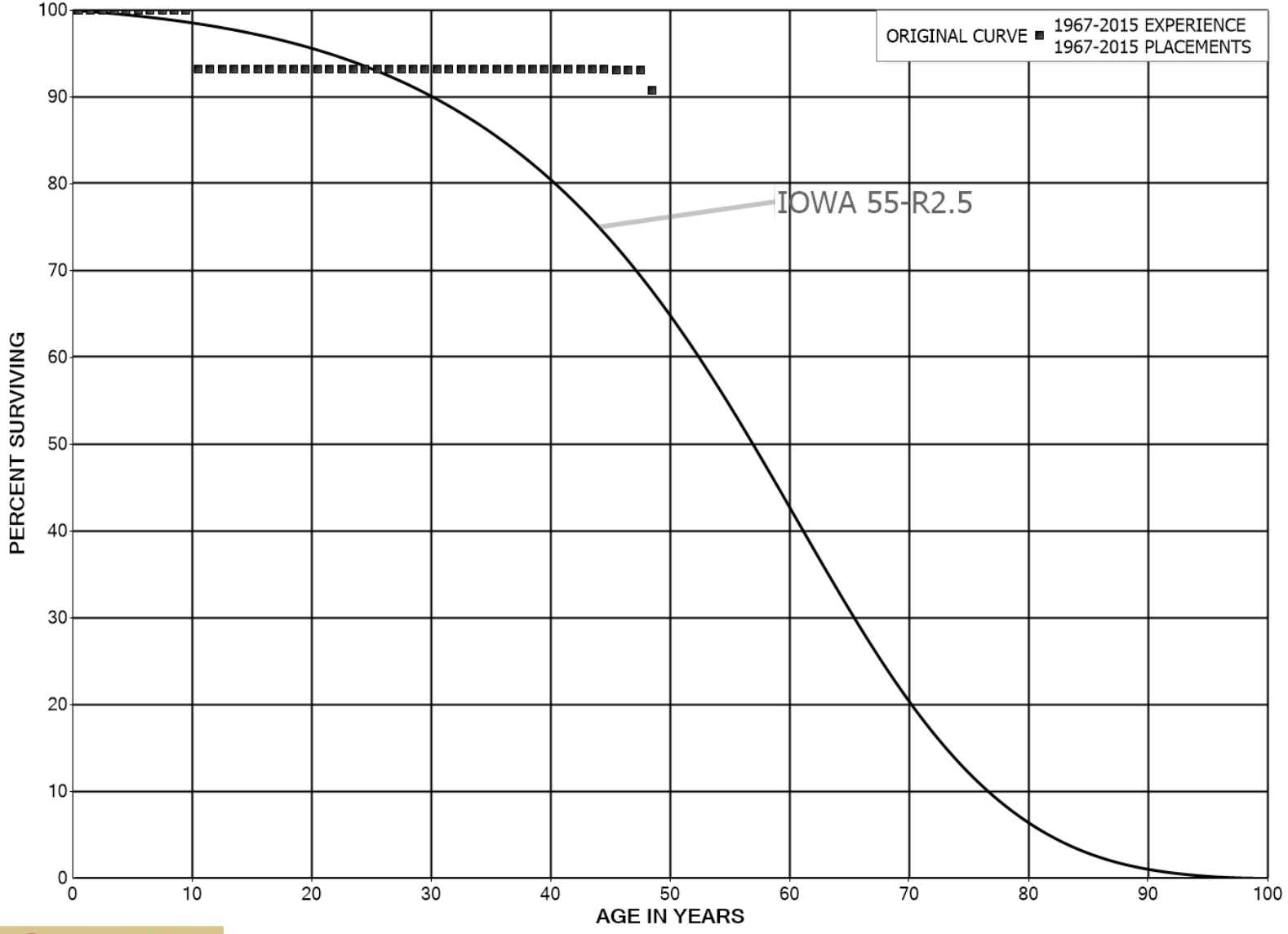
ACCOUNT T07 - TRANSFORMERS - POLE MOUNTED

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1965-2015 EXPERIENCE BAND 1965-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 64,589 | 1,253 | 0.0194 | 0.9806 | 37.80 |
| 40.5 | 63,335 | | 0.0000 | 1.0000 | 37.07 |
| 41.5 | 63,335 | | 0.0000 | 1.0000 | 37.07 |
| 42.5 | 63,335 | | 0.0000 | 1.0000 | 37.07 |
| 43.5 | 63,335 | | 0.0000 | 1.0000 | 37.07 |
| 44.5 | 63,024 | 3,526 | 0.0559 | 0.9441 | 37.07 |
| 45.5 | 16,201 | | 0.0000 | 1.0000 | 34.99 |
| 46.5 | 16,201 | | 0.0000 | 1.0000 | 34.99 |
| 47.5 | 12,695 | | 0.0000 | 1.0000 | 34.99 |
| 48.5 | | | | | 34.99 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT T09 - TURBINES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T09 - TURBINES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 104,485,714 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 92,867,454 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 87,453,107 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 74,877,766 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 73,185,902 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 73,185,902 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 72,755,889 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 71,700,417 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 71,700,417 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 69,995,413 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 69,078,643 | 4,678,499 | 0.0677 | 0.9323 | 100.00 |
| 10.5 | 64,400,143 | | 0.0000 | 1.0000 | 93.23 |
| 11.5 | 64,400,143 | | 0.0000 | 1.0000 | 93.23 |
| 12.5 | 52,470,546 | | 0.0000 | 1.0000 | 93.23 |
| 13.5 | 52,470,546 | | 0.0000 | 1.0000 | 93.23 |
| 14.5 | 52,470,546 | | 0.0000 | 1.0000 | 93.23 |
| 15.5 | 52,470,546 | | 0.0000 | 1.0000 | 93.23 |
| 16.5 | 52,470,546 | | 0.0000 | 1.0000 | 93.23 |
| 17.5 | 52,470,546 | | 0.0000 | 1.0000 | 93.23 |
| 18.5 | 52,470,546 | | 0.0000 | 1.0000 | 93.23 |
| 19.5 | 52,470,546 | | 0.0000 | 1.0000 | 93.23 |
| 20.5 | 52,468,967 | | 0.0000 | 1.0000 | 93.23 |
| 21.5 | 52,468,967 | | 0.0000 | 1.0000 | 93.23 |
| 22.5 | 52,468,967 | | 0.0000 | 1.0000 | 93.23 |
| 23.5 | 52,468,967 | | 0.0000 | 1.0000 | 93.23 |
| 24.5 | 52,468,967 | | 0.0000 | 1.0000 | 93.23 |
| 25.5 | 52,468,967 | | 0.0000 | 1.0000 | 93.23 |
| 26.5 | 50,881,792 | | 0.0000 | 1.0000 | 93.23 |
| 27.5 | 43,971,956 | | 0.0000 | 1.0000 | 93.23 |
| 28.5 | 43,963,063 | | 0.0000 | 1.0000 | 93.23 |
| 29.5 | 43,963,063 | | 0.0000 | 1.0000 | 93.23 |
| 30.5 | 33,036,048 | | 0.0000 | 1.0000 | 93.23 |
| 31.5 | 33,036,048 | | 0.0000 | 1.0000 | 93.23 |
| 32.5 | 32,989,272 | | 0.0000 | 1.0000 | 93.23 |
| 33.5 | 25,897,915 | | 0.0000 | 1.0000 | 93.23 |
| 34.5 | 25,897,915 | | 0.0000 | 1.0000 | 93.23 |
| 35.5 | 16,711,577 | | 0.0000 | 1.0000 | 93.23 |
| 36.5 | 16,711,577 | | 0.0000 | 1.0000 | 93.23 |
| 37.5 | 12,468,906 | 2,201 | 0.0002 | 0.9998 | 93.23 |
| 38.5 | 12,248,799 | | 0.0000 | 1.0000 | 93.21 |

NEWFOUNDLAND AND LABRADOR HYDRO

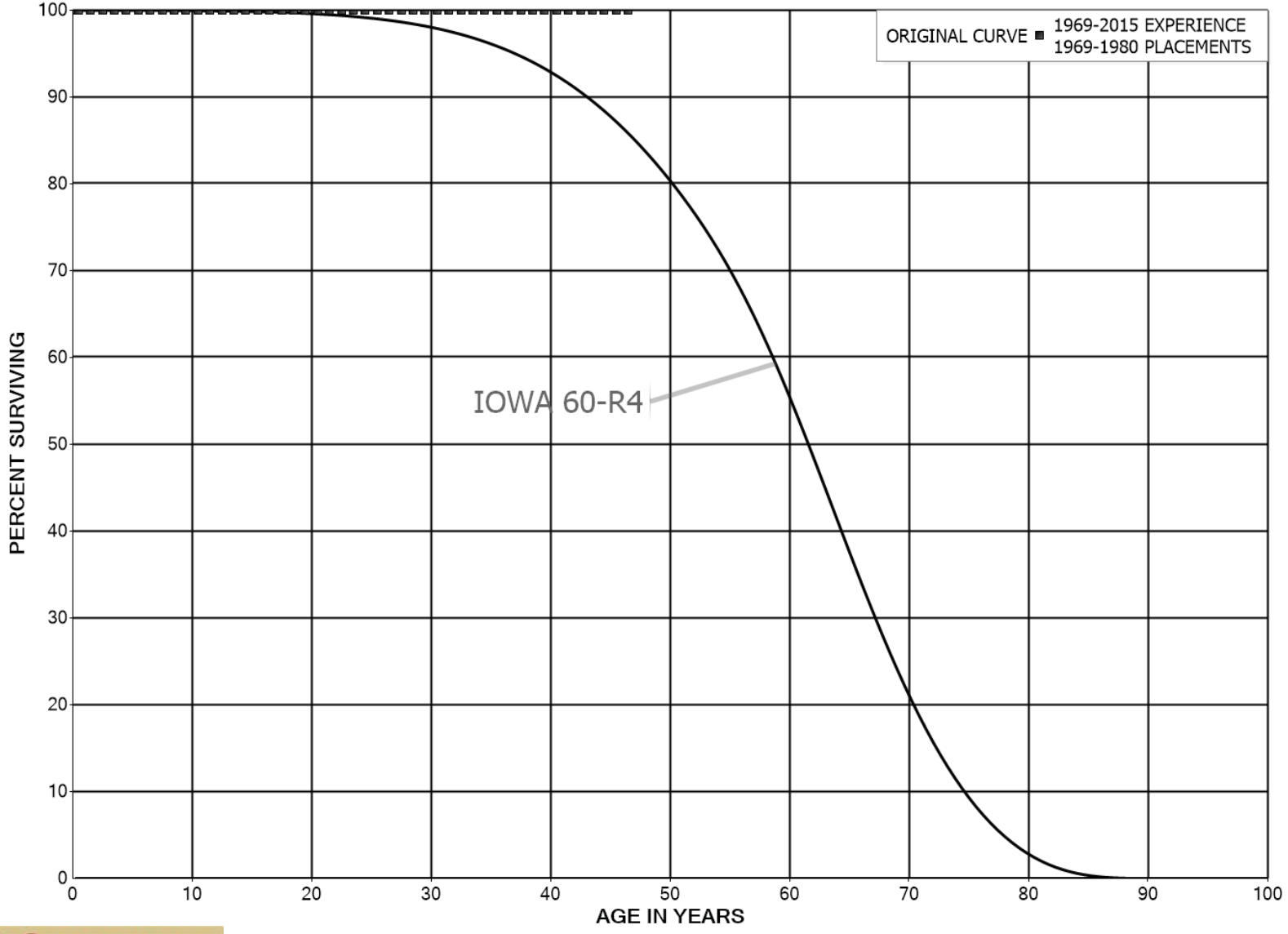
ACCOUNT T09 - TURBINES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 12,248,799 | | 0.0000 | 1.0000 | 93.21 |
| 40.5 | 12,146,926 | | 0.0000 | 1.0000 | 93.21 |
| 41.5 | 12,146,926 | | 0.0000 | 1.0000 | 93.21 |
| 42.5 | 12,146,926 | 5,339 | 0.0004 | 0.9996 | 93.21 |
| 43.5 | 12,141,587 | 5,339 | 0.0004 | 0.9996 | 93.17 |
| 44.5 | 12,110,248 | 8,333 | 0.0007 | 0.9993 | 93.13 |
| 45.5 | 10,418,575 | | 0.0000 | 1.0000 | 93.06 |
| 46.5 | 10,418,575 | 4,593 | 0.0004 | 0.9996 | 93.06 |
| 47.5 | 1,806,578 | 43,789 | 0.0242 | 0.9758 | 93.02 |
| 48.5 | | | | | 90.77 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT V01 - VACUUM CLEANING SYSTEM
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT V01 - VACUUM CLEANING SYSTEM

ORIGINAL LIFE TABLE

PLACEMENT BAND 1969-1980 EXPERIENCE BAND 1969-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 72,451 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

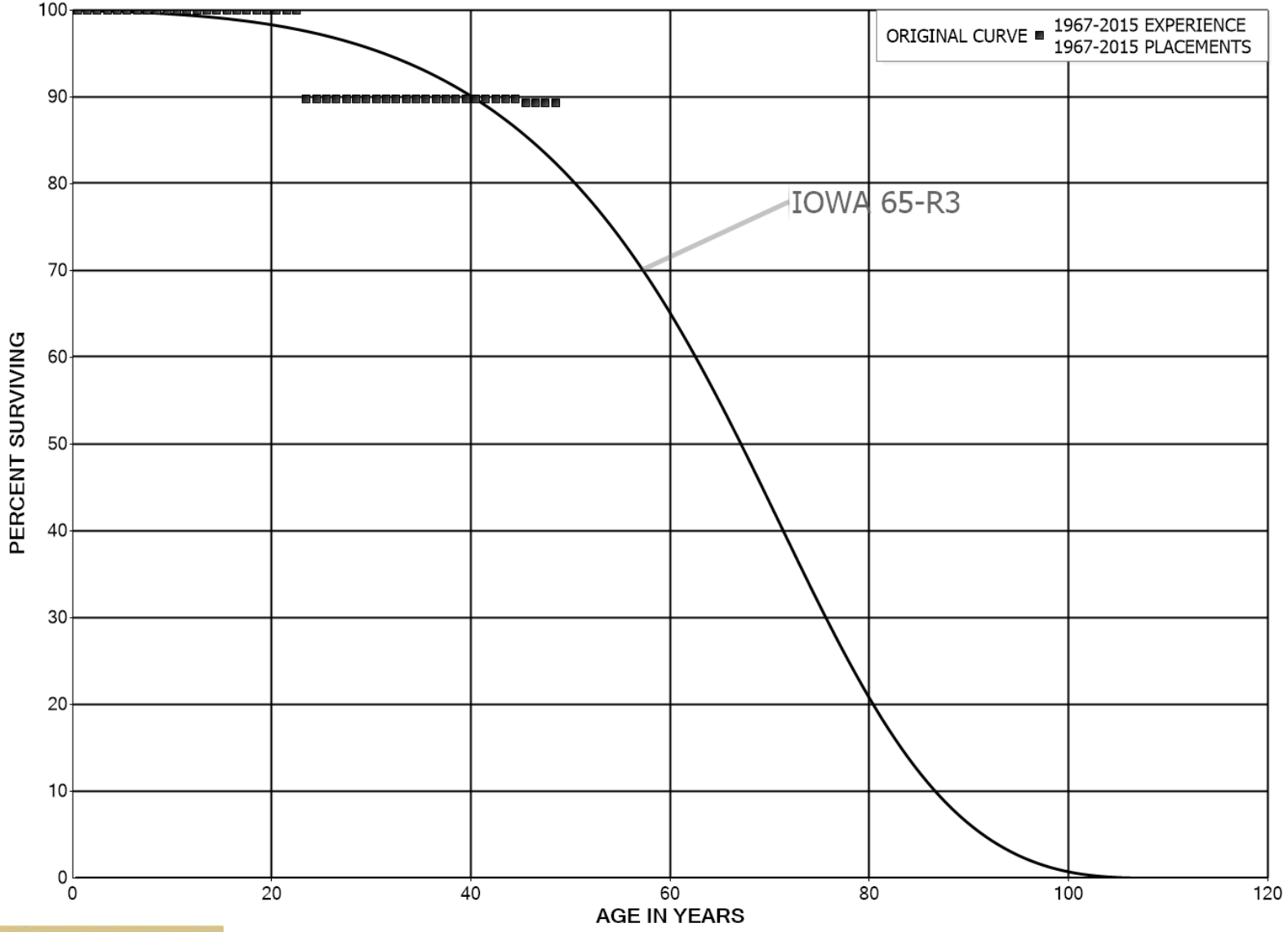
ACCOUNT V01 - VACUUM CLEANING SYSTEM

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1969-1980 EXPERIENCE BAND 1969-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |
| 40.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |
| 41.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |
| 42.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |
| 43.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |
| 44.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |
| 45.5 | 23,574 | | 0.0000 | 1.0000 | 100.00 |
| 46.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT V02 - VALVES - PENSTOCK
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT V02 - VALVES - PENSTOCK

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 8,073,931 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 7,853,424 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 7,853,424 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 7,853,424 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 7,853,424 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 7,853,424 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 7,853,424 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 7,853,424 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 5,978,246 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 5,848,451 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 5,671,553 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 5,459,235 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 5,247,883 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 5,011,386 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 5,011,386 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 4,816,450 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 4,816,450 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 4,816,450 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 4,816,450 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 4,816,450 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 4,816,450 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 4,816,450 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 4,816,450 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 4,816,450 | 497,499 | 0.1033 | 0.8967 | 100.00 |
| 23.5 | 4,318,951 | | 0.0000 | 1.0000 | 89.67 |
| 24.5 | 4,318,951 | | 0.0000 | 1.0000 | 89.67 |
| 25.5 | 4,318,951 | | 0.0000 | 1.0000 | 89.67 |
| 26.5 | 4,318,951 | | 0.0000 | 1.0000 | 89.67 |
| 27.5 | 4,316,519 | | 0.0000 | 1.0000 | 89.67 |
| 28.5 | 4,316,519 | | 0.0000 | 1.0000 | 89.67 |
| 29.5 | 4,316,519 | | 0.0000 | 1.0000 | 89.67 |
| 30.5 | 2,111,625 | | 0.0000 | 1.0000 | 89.67 |
| 31.5 | 2,111,625 | | 0.0000 | 1.0000 | 89.67 |
| 32.5 | 2,111,625 | | 0.0000 | 1.0000 | 89.67 |
| 33.5 | 2,089,406 | | 0.0000 | 1.0000 | 89.67 |
| 34.5 | 2,089,406 | | 0.0000 | 1.0000 | 89.67 |
| 35.5 | 2,089,406 | | 0.0000 | 1.0000 | 89.67 |
| 36.5 | 2,089,406 | | 0.0000 | 1.0000 | 89.67 |
| 37.5 | 2,089,406 | | 0.0000 | 1.0000 | 89.67 |
| 38.5 | 1,985,406 | | 0.0000 | 1.0000 | 89.67 |

NEWFOUNDLAND AND LABRADOR HYDRO

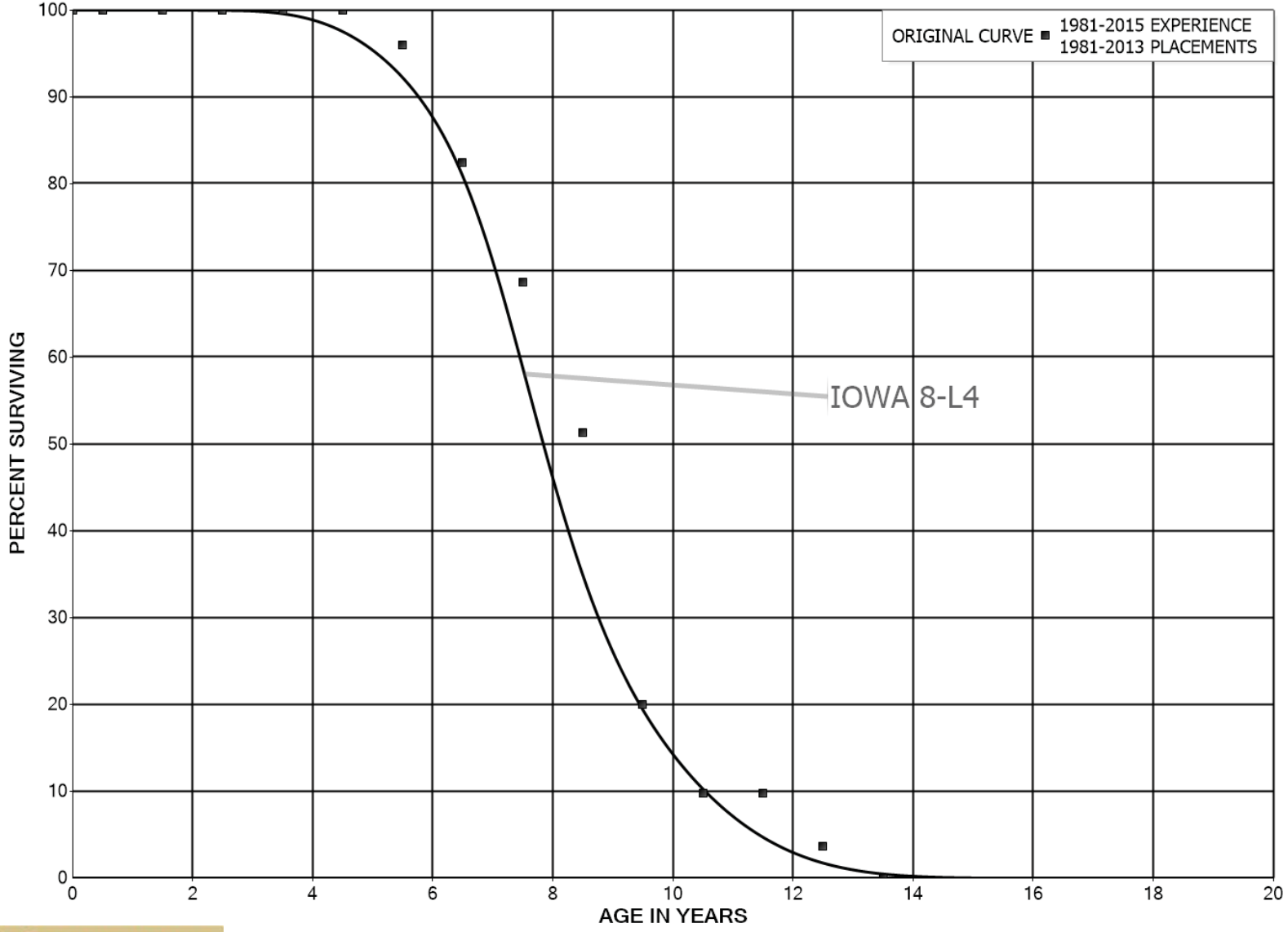
ACCOUNT V02 - VALVES - PENSTOCK

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2015 EXPERIENCE BAND 1967-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 1,985,406 | | 0.0000 | 1.0000 | 89.67 |
| 40.5 | 1,971,105 | | 0.0000 | 1.0000 | 89.67 |
| 41.5 | 1,971,105 | | 0.0000 | 1.0000 | 89.67 |
| 42.5 | 1,971,105 | | 0.0000 | 1.0000 | 89.67 |
| 43.5 | 1,971,105 | | 0.0000 | 1.0000 | 89.67 |
| 44.5 | 1,971,105 | 8,672 | 0.0044 | 0.9956 | 89.67 |
| 45.5 | 1,415,205 | | 0.0000 | 1.0000 | 89.28 |
| 46.5 | 1,415,205 | | 0.0000 | 1.0000 | 89.28 |
| 47.5 | 1,415,205 | | 0.0000 | 1.0000 | 89.28 |
| 48.5 | | | | | 89.28 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT V03 - VEHICLES - 1 TON
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

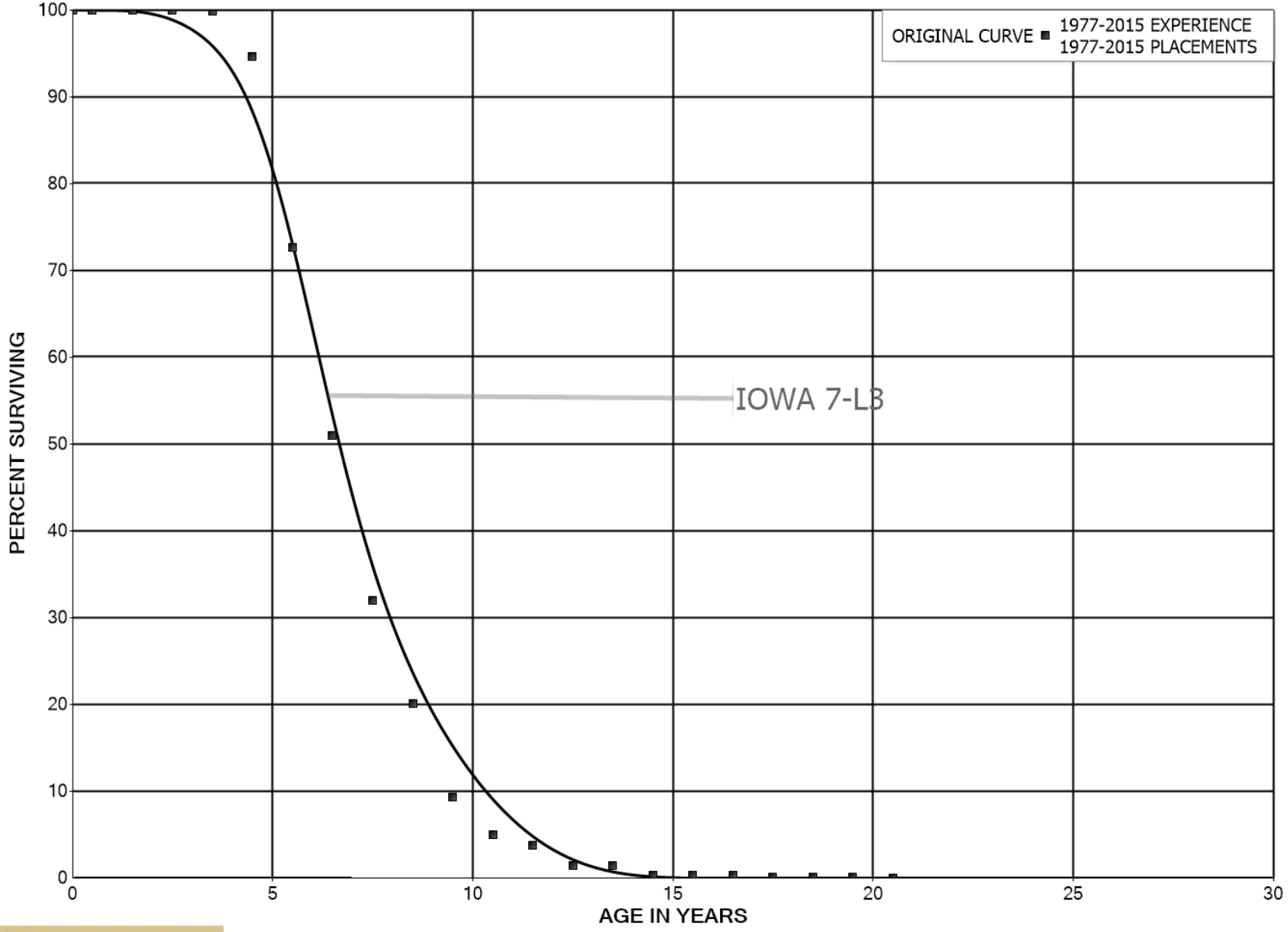
ACCOUNT V03 - VEHICLES - 1 TON

ORIGINAL LIFE TABLE

PLACEMENT BAND 1981-2013 EXPERIENCE BAND 1981-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 379,343 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 379,343 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 379,343 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 327,695 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 327,695 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 327,695 | 13,283 | 0.0405 | 0.9595 | 100.00 |
| 5.5 | 314,412 | 44,240 | 0.1407 | 0.8593 | 95.95 |
| 6.5 | 270,173 | 45,393 | 0.1680 | 0.8320 | 82.45 |
| 7.5 | 224,780 | 56,766 | 0.2525 | 0.7475 | 68.59 |
| 8.5 | 168,014 | 102,809 | 0.6119 | 0.3881 | 51.27 |
| 9.5 | 65,206 | 33,491 | 0.5136 | 0.4864 | 19.90 |
| 10.5 | 31,715 | | 0.0000 | 1.0000 | 9.68 |
| 11.5 | 31,715 | 19,876 | 0.6267 | 0.3733 | 9.68 |
| 12.5 | 11,838 | 11,838 | 1.0000 | | 3.61 |
| 13.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT V04 - VEHICLES - 3/4 TON AND UNDER
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

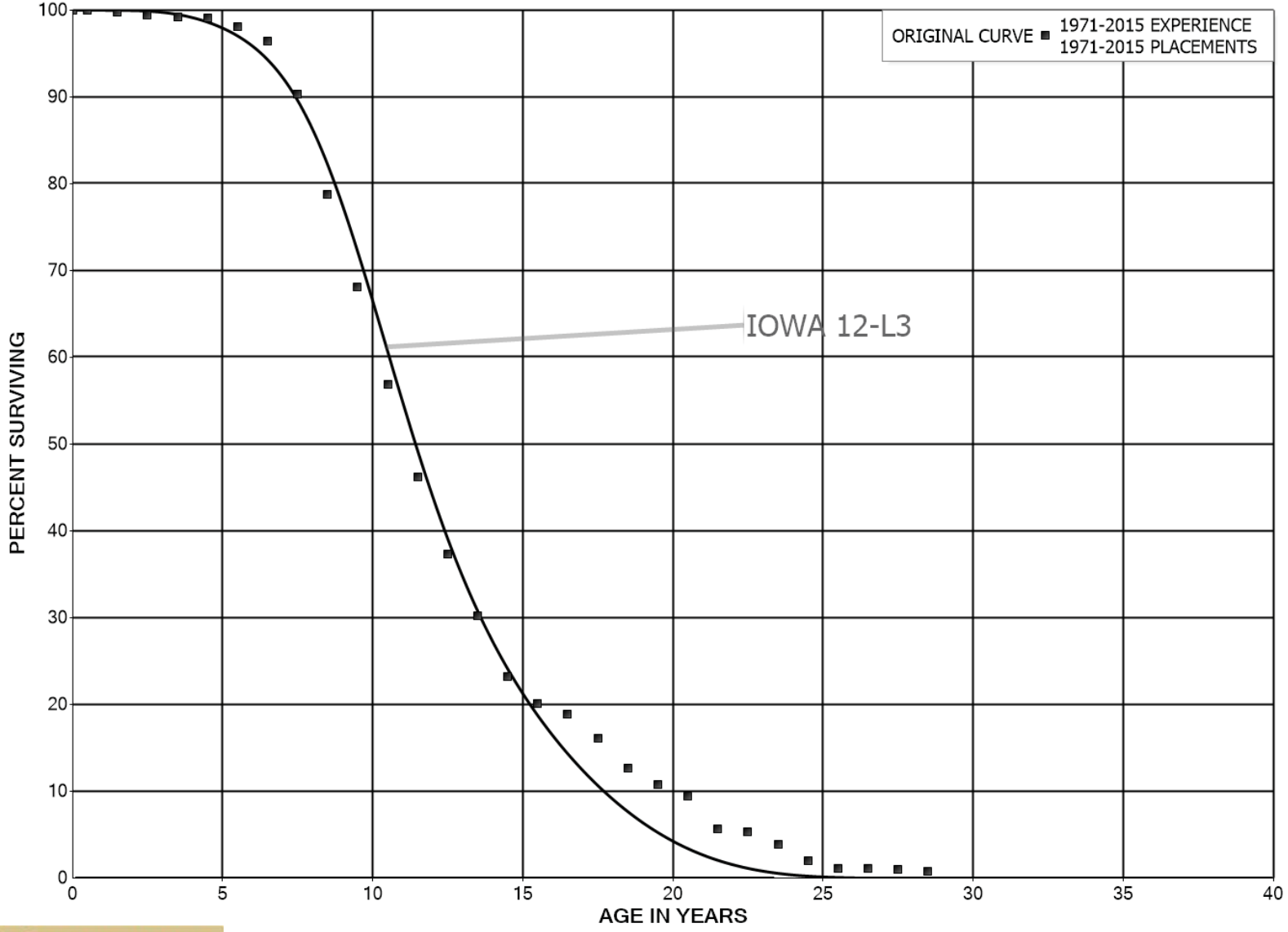
ACCOUNT V04 - VEHICLES - 3/4 TON AND UNDER

ORIGINAL LIFE TABLE

PLACEMENT BAND 1977-2015 EXPERIENCE BAND 1977-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 13,593,915 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 12,522,318 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 11,803,485 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 11,521,445 | 14,631 | 0.0013 | 0.9987 | 100.00 |
| 3.5 | 10,756,433 | 568,573 | 0.0529 | 0.9471 | 99.87 |
| 4.5 | 9,466,923 | 2,199,136 | 0.2323 | 0.7677 | 94.59 |
| 5.5 | 6,450,055 | 1,927,343 | 0.2988 | 0.7012 | 72.62 |
| 6.5 | 4,070,137 | 1,512,403 | 0.3716 | 0.6284 | 50.92 |
| 7.5 | 2,481,830 | 923,593 | 0.3721 | 0.6279 | 32.00 |
| 8.5 | 1,302,139 | 698,230 | 0.5362 | 0.4638 | 20.09 |
| 9.5 | 603,909 | 286,197 | 0.4739 | 0.5261 | 9.32 |
| 10.5 | 317,713 | 79,109 | 0.2490 | 0.7510 | 4.90 |
| 11.5 | 217,530 | 133,534 | 0.6139 | 0.3861 | 3.68 |
| 12.5 | 83,997 | 3,550 | 0.0423 | 0.9577 | 1.42 |
| 13.5 | 80,446 | 62,639 | 0.7786 | 0.2214 | 1.36 |
| 14.5 | 17,807 | | 0.0000 | 1.0000 | 0.30 |
| 15.5 | 17,807 | 2,532 | 0.1422 | 0.8578 | 0.30 |
| 16.5 | 15,275 | 8,795 | 0.5758 | 0.4242 | 0.26 |
| 17.5 | 6,480 | | 0.0000 | 1.0000 | 0.11 |
| 18.5 | 6,480 | 4,537 | 0.7001 | 0.2999 | 0.11 |
| 19.5 | 1,943 | 1,943 | 1.0000 | | 0.03 |
| 20.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT V05 - VEHICLES - BOOMS/BODIES/CRANES/CAB/CHASSIS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

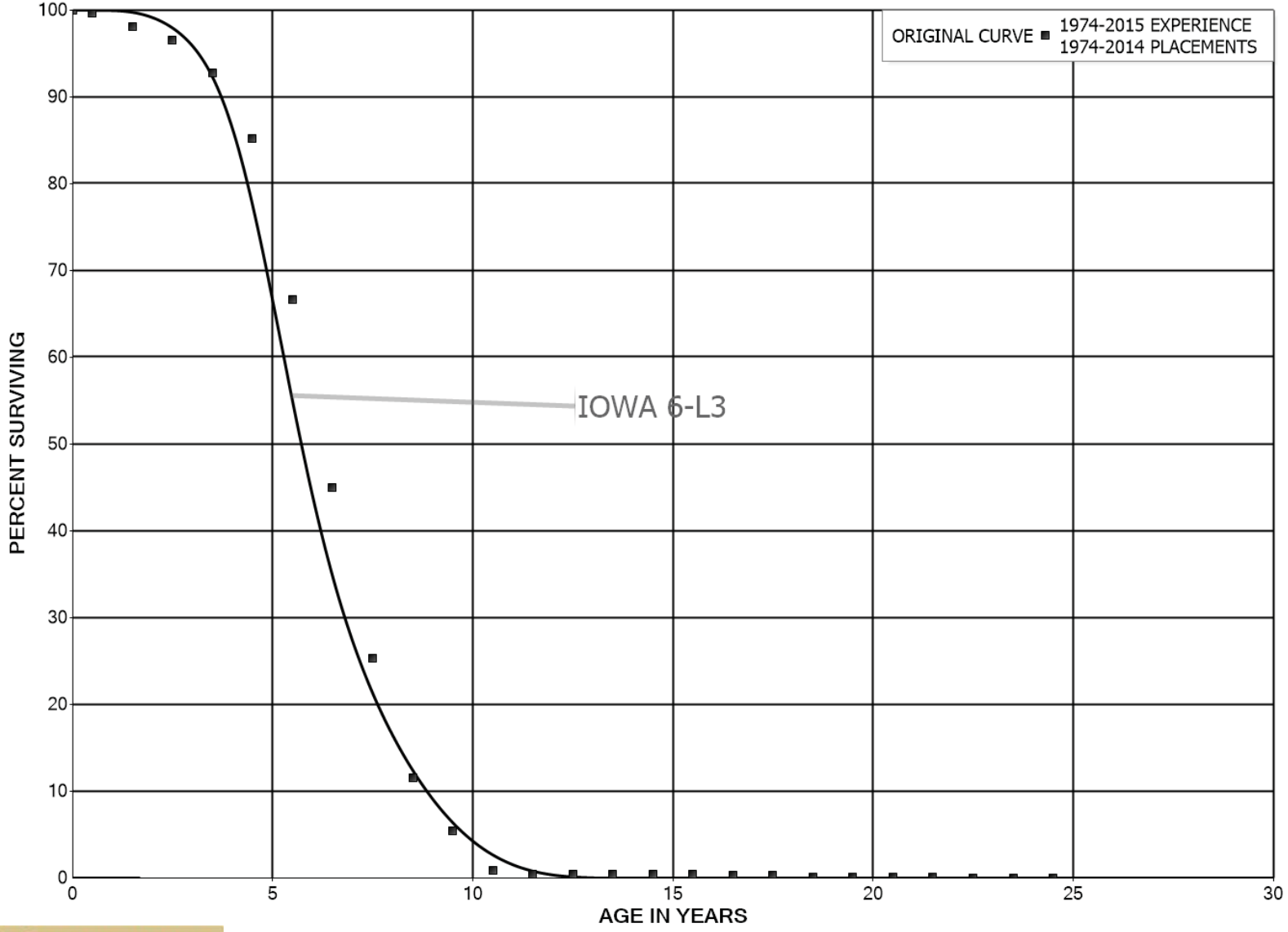
ACCOUNT V05 - VEHICLES - BOOMS/BODIES/CRANES/CAB/CHASSIS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1971-2015 EXPERIENCE BAND 1971-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 27,223,902 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 24,655,661 | 68,025 | 0.0028 | 0.9972 | 100.00 |
| 1.5 | 23,611,135 | 84,894 | 0.0036 | 0.9964 | 99.72 |
| 2.5 | 22,203,256 | 40,397 | 0.0018 | 0.9982 | 99.37 |
| 3.5 | 20,170,991 | 15,155 | 0.0008 | 0.9992 | 99.18 |
| 4.5 | 18,491,838 | 202,273 | 0.0109 | 0.9891 | 99.11 |
| 5.5 | 17,542,955 | 301,536 | 0.0172 | 0.9828 | 98.03 |
| 6.5 | 15,403,032 | 973,183 | 0.0632 | 0.9368 | 96.34 |
| 7.5 | 13,818,921 | 1,768,914 | 0.1280 | 0.8720 | 90.25 |
| 8.5 | 10,585,012 | 1,423,991 | 0.1345 | 0.8655 | 78.70 |
| 9.5 | 8,847,582 | 1,460,983 | 0.1651 | 0.8349 | 68.11 |
| 10.5 | 6,751,902 | 1,263,554 | 0.1871 | 0.8129 | 56.87 |
| 11.5 | 5,022,061 | 975,560 | 0.1943 | 0.8057 | 46.22 |
| 12.5 | 3,843,935 | 727,581 | 0.1893 | 0.8107 | 37.24 |
| 13.5 | 2,986,309 | 696,520 | 0.2332 | 0.7668 | 30.20 |
| 14.5 | 2,289,789 | 301,191 | 0.1315 | 0.8685 | 23.15 |
| 15.5 | 1,965,599 | 124,552 | 0.0634 | 0.9366 | 20.11 |
| 16.5 | 1,841,046 | 273,432 | 0.1485 | 0.8515 | 18.83 |
| 17.5 | 1,567,615 | 332,219 | 0.2119 | 0.7881 | 16.04 |
| 18.5 | 1,235,396 | 185,014 | 0.1498 | 0.8502 | 12.64 |
| 19.5 | 1,050,382 | 129,020 | 0.1228 | 0.8772 | 10.74 |
| 20.5 | 921,362 | 369,877 | 0.4014 | 0.5986 | 9.43 |
| 21.5 | 551,486 | 31,815 | 0.0577 | 0.9423 | 5.64 |
| 22.5 | 519,671 | 149,068 | 0.2869 | 0.7131 | 5.32 |
| 23.5 | 370,603 | 183,466 | 0.4950 | 0.5050 | 3.79 |
| 24.5 | 187,137 | 80,847 | 0.4320 | 0.5680 | 1.91 |
| 25.5 | 106,290 | 6,157 | 0.0579 | 0.9421 | 1.09 |
| 26.5 | 100,133 | 11,503 | 0.1149 | 0.8851 | 1.02 |
| 27.5 | 88,629 | 16,230 | 0.1831 | 0.8169 | 0.91 |
| 28.5 | 72,399 | | 0.0000 | 1.0000 | 0.74 |
| 29.5 | 72,399 | 44,189 | 0.6104 | 0.3896 | 0.74 |
| 30.5 | 28,210 | 28,210 | 1.0000 | | 0.29 |
| 31.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT V06 - VEHICLES - CARS, STATION WAGONS AND VANS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

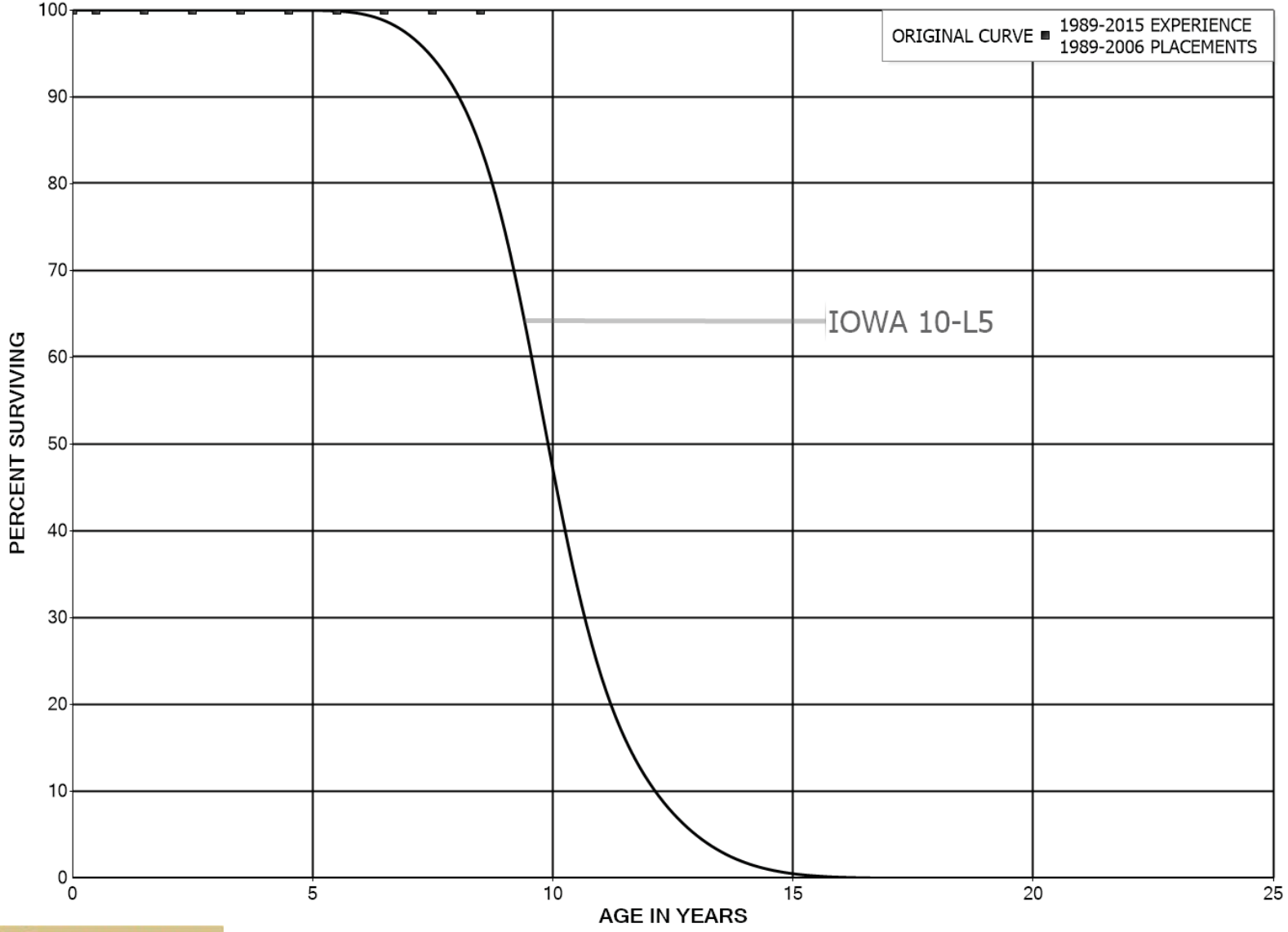
ACCOUNT V06 - VEHICLES - CARS, STATION WAGONS AND VANS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1974-2014 EXPERIENCE BAND 1974-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 9,814,453 | 34,490 | 0.0035 | 0.9965 | 100.00 |
| 0.5 | 9,779,963 | 150,355 | 0.0154 | 0.9846 | 99.65 |
| 1.5 | 9,409,596 | 159,717 | 0.0170 | 0.9830 | 98.12 |
| 2.5 | 8,973,608 | 343,570 | 0.0383 | 0.9617 | 96.45 |
| 3.5 | 8,426,528 | 684,758 | 0.0813 | 0.9187 | 92.76 |
| 4.5 | 7,460,987 | 1,632,087 | 0.2187 | 0.7813 | 85.22 |
| 5.5 | 5,542,176 | 1,804,839 | 0.3257 | 0.6743 | 66.58 |
| 6.5 | 3,500,464 | 1,528,182 | 0.4366 | 0.5634 | 44.90 |
| 7.5 | 1,733,996 | 941,698 | 0.5431 | 0.4569 | 25.30 |
| 8.5 | 760,437 | 402,658 | 0.5295 | 0.4705 | 11.56 |
| 9.5 | 336,728 | 286,895 | 0.8520 | 0.1480 | 5.44 |
| 10.5 | 49,833 | 28,612 | 0.5742 | 0.4258 | 0.80 |
| 11.5 | 21,221 | | 0.0000 | 1.0000 | 0.34 |
| 12.5 | 21,221 | | 0.0000 | 1.0000 | 0.34 |
| 13.5 | 21,221 | | 0.0000 | 1.0000 | 0.34 |
| 14.5 | 21,221 | | 0.0000 | 1.0000 | 0.34 |
| 15.5 | 21,221 | 2,230 | 0.1051 | 0.8949 | 0.34 |
| 16.5 | 18,991 | | 0.0000 | 1.0000 | 0.31 |
| 17.5 | 18,991 | 12,282 | 0.6467 | 0.3533 | 0.31 |
| 18.5 | 6,709 | | 0.0000 | 1.0000 | 0.11 |
| 19.5 | 6,709 | | 0.0000 | 1.0000 | 0.11 |
| 20.5 | 6,709 | | 0.0000 | 1.0000 | 0.11 |
| 21.5 | 6,709 | 6,208 | 0.9252 | 0.0748 | 0.11 |
| 22.5 | 502 | | 0.0000 | 1.0000 | 0.01 |
| 23.5 | 502 | 502 | 1.0000 | | 0.01 |
| 24.5 | | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT V07 - VEHICLES - DUMP TRUCKS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

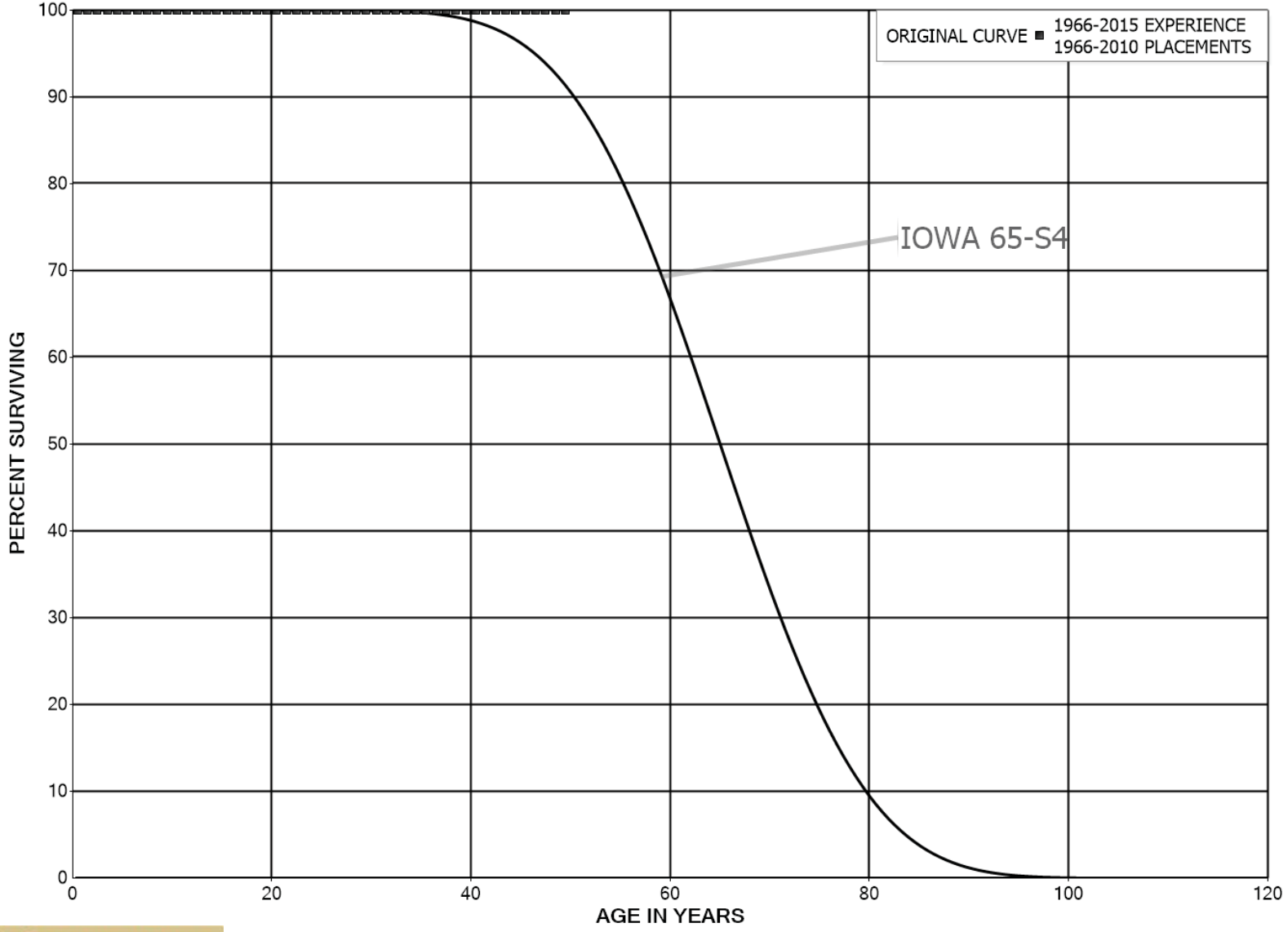
ACCOUNT V07 - VEHICLES - DUMP TRUCKS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1989-2006 EXPERIENCE BAND 1989-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 36,457 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 36,457 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 36,457 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 36,457 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 36,457 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 36,457 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 36,457 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 36,457 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 36,457 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 36,457 | 24,922 | 0.6836 | 0.3164 | 100.00 |
| 9.5 | 11,535 | | 0.0000 | 1.0000 | 31.64 |
| 10.5 | 11,535 | | 0.0000 | 1.0000 | 31.64 |
| 11.5 | 11,535 | | 0.0000 | 1.0000 | 31.64 |
| 12.5 | | | | | 31.64 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT W01 - WATER REGULATING STRUCTURES
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W01 - WATER REGULATING STRUCTURES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2010 EXPERIENCE BAND 1966-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 22,451,738 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 22,451,738 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 22,451,738 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 22,451,738 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 22,451,738 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 22,451,738 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 22,156,264 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 22,156,264 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 22,156,264 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 22,156,264 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 22,156,264 | | 0.0000 | 1.0000 | 100.00 |
| 10.5 | 22,156,264 | | 0.0000 | 1.0000 | 100.00 |
| 11.5 | 22,156,264 | | 0.0000 | 1.0000 | 100.00 |
| 12.5 | 6,815,749 | | 0.0000 | 1.0000 | 100.00 |
| 13.5 | 6,815,749 | | 0.0000 | 1.0000 | 100.00 |
| 14.5 | 6,815,749 | | 0.0000 | 1.0000 | 100.00 |
| 15.5 | 6,815,749 | | 0.0000 | 1.0000 | 100.00 |
| 16.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 17.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 18.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 19.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 20.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 21.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 22.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 23.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 24.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 25.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 26.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 27.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 28.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 29.5 | 6,764,780 | | 0.0000 | 1.0000 | 100.00 |
| 30.5 | 6,759,713 | | 0.0000 | 1.0000 | 100.00 |
| 31.5 | 6,759,713 | | 0.0000 | 1.0000 | 100.00 |
| 32.5 | 4,998,878 | | 0.0000 | 1.0000 | 100.00 |
| 33.5 | 4,998,878 | | 0.0000 | 1.0000 | 100.00 |
| 34.5 | 4,998,878 | | 0.0000 | 1.0000 | 100.00 |
| 35.5 | 4,976,785 | | 0.0000 | 1.0000 | 100.00 |
| 36.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 37.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 38.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |

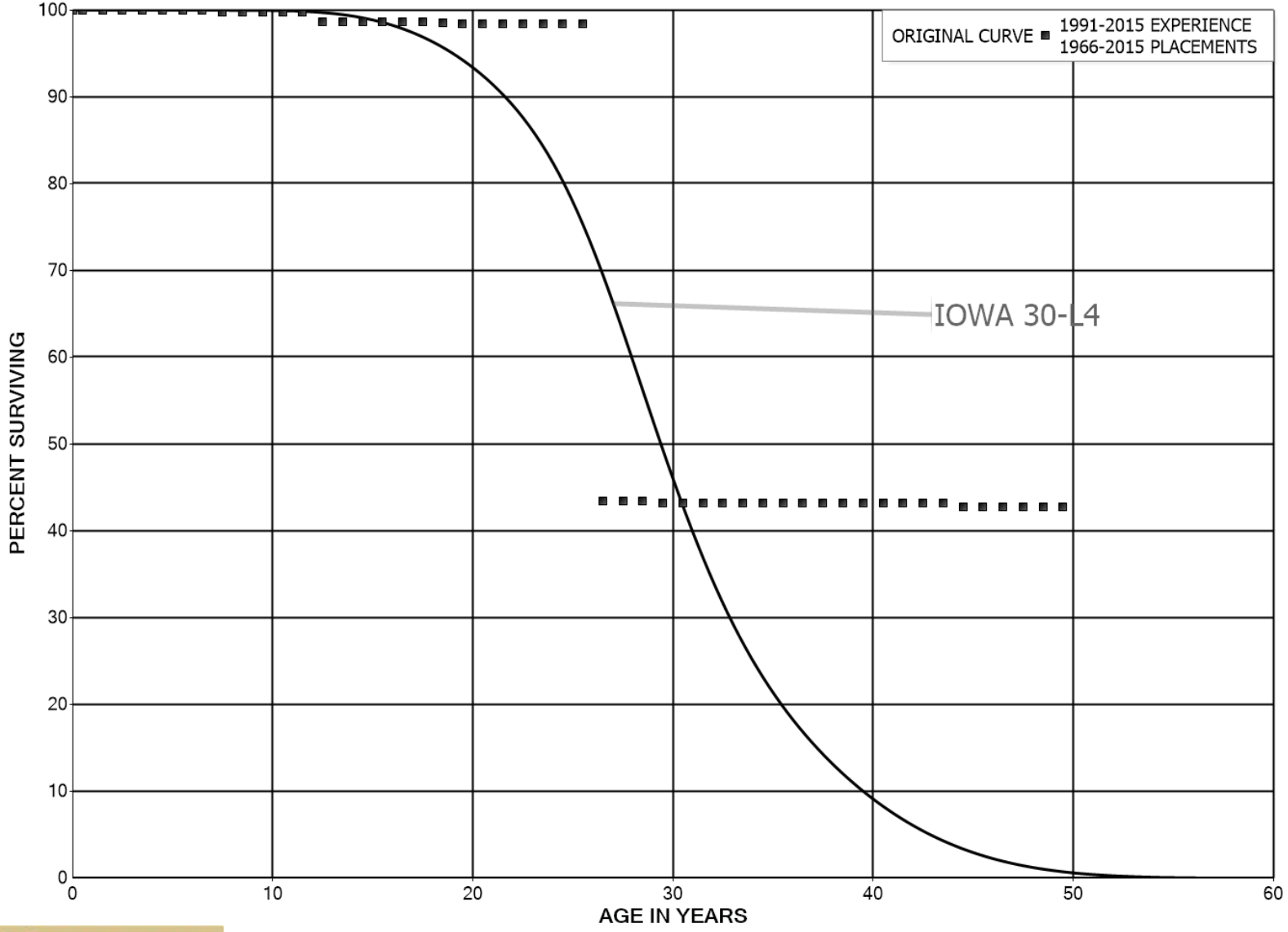
NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W01 - WATER REGULATING STRUCTURES

ORIGINAL LIFE TABLE, CONT.

| PLACEMENT BAND 1966-2010 | | | EXPERIENCE BAND 1966-2015 | | |
|---|---|---|---|---|---|
| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
| 39.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 40.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 41.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 42.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 43.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 44.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 45.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 46.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 47.5 | 3,053,361 | | 0.0000 | 1.0000 | 100.00 |
| 48.5 | 781,461 | | 0.0000 | 1.0000 | 100.00 |
| 49.5 | | | | | 100.00 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT W02 - WATER SYSTEMS
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W02 - WATER SYSTEMS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1991-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 2,324,846 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 2,124,283 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 2,259,981 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 2,084,208 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 2,124,231 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 2,125,340 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 2,454,829 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 2,457,165 | 7,626 | 0.0031 | 0.9969 | 100.00 |
| 7.5 | 2,395,303 | | 0.0000 | 1.0000 | 99.69 |
| 8.5 | 3,784,905 | | 0.0000 | 1.0000 | 99.69 |
| 9.5 | 3,776,339 | | 0.0000 | 1.0000 | 99.69 |
| 10.5 | 3,752,978 | | 0.0000 | 1.0000 | 99.69 |
| 11.5 | 3,919,163 | 40,451 | 0.0103 | 0.9897 | 99.69 |
| 12.5 | 2,688,795 | | 0.0000 | 1.0000 | 98.66 |
| 13.5 | 2,721,048 | | 0.0000 | 1.0000 | 98.66 |
| 14.5 | 2,734,055 | | 0.0000 | 1.0000 | 98.66 |
| 15.5 | 2,734,055 | | 0.0000 | 1.0000 | 98.66 |
| 16.5 | 2,715,938 | | 0.0000 | 1.0000 | 98.66 |
| 17.5 | 2,715,938 | 5,586 | 0.0021 | 0.9979 | 98.66 |
| 18.5 | 2,710,352 | 2,336 | 0.0009 | 0.9991 | 98.46 |
| 19.5 | 2,678,403 | | 0.0000 | 1.0000 | 98.37 |
| 20.5 | 2,544,238 | | 0.0000 | 1.0000 | 98.37 |
| 21.5 | 2,575,860 | | 0.0000 | 1.0000 | 98.37 |
| 22.5 | 2,565,367 | | 0.0000 | 1.0000 | 98.37 |
| 23.5 | 2,484,432 | | 0.0000 | 1.0000 | 98.37 |
| 24.5 | 2,492,740 | | 0.0000 | 1.0000 | 98.37 |
| 25.5 | 2,447,836 | 1,367,535 | 0.5587 | 0.4413 | 98.37 |
| 26.5 | 944,603 | | 0.0000 | 1.0000 | 43.41 |
| 27.5 | 851,259 | | 0.0000 | 1.0000 | 43.41 |
| 28.5 | 811,236 | 3,483 | 0.0043 | 0.9957 | 43.41 |
| 29.5 | 797,394 | | 0.0000 | 1.0000 | 43.23 |
| 30.5 | 470,655 | | 0.0000 | 1.0000 | 43.23 |
| 31.5 | 470,655 | | 0.0000 | 1.0000 | 43.23 |
| 32.5 | 470,655 | | 0.0000 | 1.0000 | 43.23 |
| 33.5 | 398,413 | | 0.0000 | 1.0000 | 43.23 |
| 34.5 | 381,761 | | 0.0000 | 1.0000 | 43.23 |
| 35.5 | 366,294 | | 0.0000 | 1.0000 | 43.23 |
| 36.5 | 200,109 | | 0.0000 | 1.0000 | 43.23 |
| 37.5 | 147,452 | | 0.0000 | 1.0000 | 43.23 |
| 38.5 | 115,200 | | 0.0000 | 1.0000 | 43.23 |

NEWFOUNDLAND AND LABRADOR HYDRO

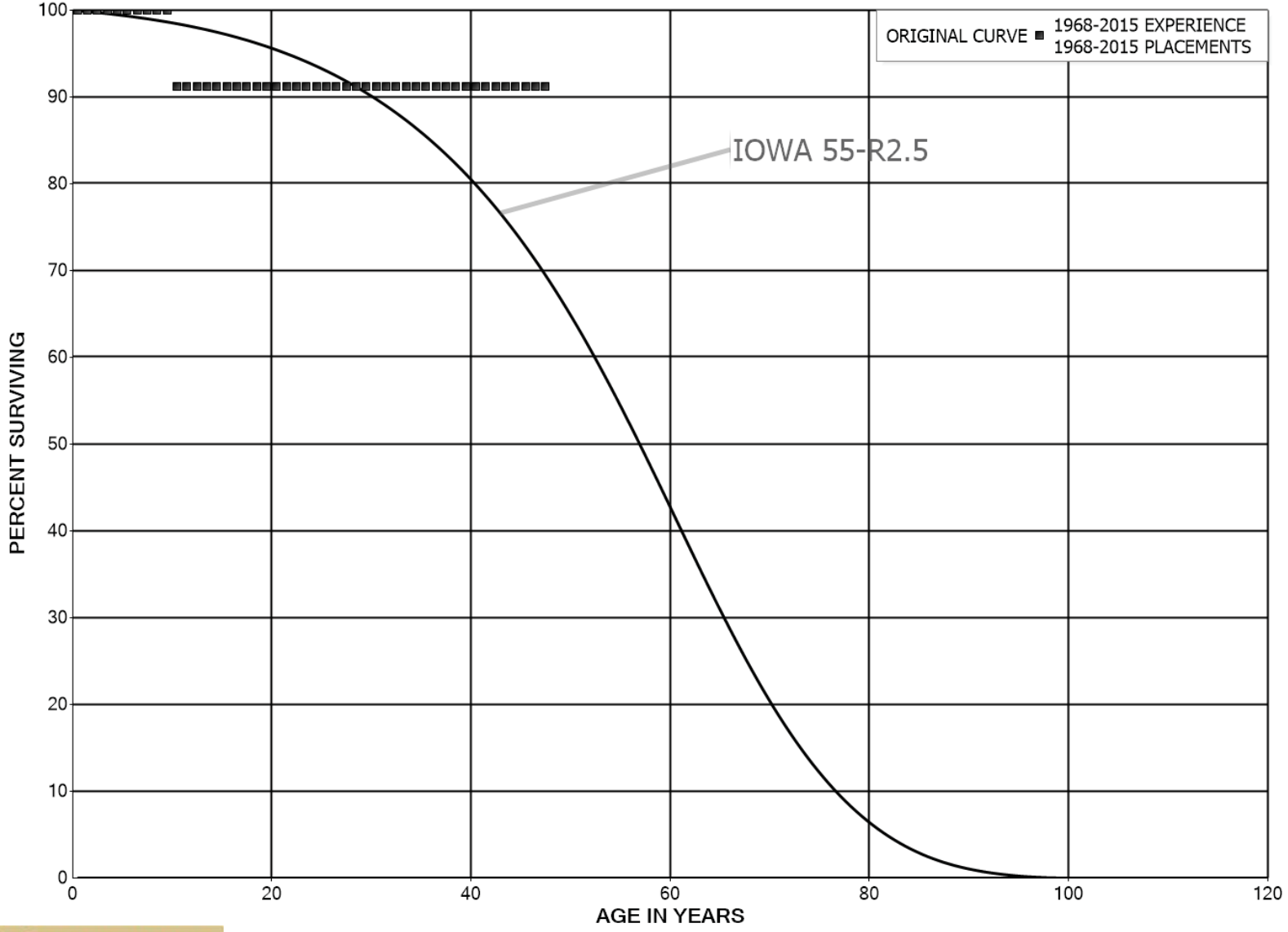
ACCOUNT W02 - WATER SYSTEMS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1966-2015 EXPERIENCE BAND 1991-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 102,192 | | 0.0000 | 1.0000 | 43.23 |
| 40.5 | 102,192 | | 0.0000 | 1.0000 | 43.23 |
| 41.5 | 102,192 | | 0.0000 | 1.0000 | 43.23 |
| 42.5 | 102,192 | | 0.0000 | 1.0000 | 43.23 |
| 43.5 | 102,192 | 1,101 | 0.0108 | 0.9892 | 43.23 |
| 44.5 | 91,345 | | 0.0000 | 1.0000 | 42.76 |
| 45.5 | 85,567 | | 0.0000 | 1.0000 | 42.76 |
| 46.5 | 53,945 | | 0.0000 | 1.0000 | 42.76 |
| 47.5 | 46,655 | | 0.0000 | 1.0000 | 42.76 |
| 48.5 | 36,616 | | 0.0000 | 1.0000 | 42.76 |
| 49.5 | | | | | 42.76 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT W03 - WATER SYSTEMS - FEED
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W03 - WATER SYSTEMS - FEED

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 9,917,971 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 6,675,751 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 6,580,151 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 6,409,265 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 6,409,265 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 6,409,265 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 6,409,265 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 6,409,265 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 6,409,265 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 6,409,265 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 6,409,265 | 564,259 | 0.0880 | 0.9120 | 100.00 |
| 10.5 | 5,845,006 | | 0.0000 | 1.0000 | 91.20 |
| 11.5 | 5,845,006 | | 0.0000 | 1.0000 | 91.20 |
| 12.5 | 5,845,006 | | 0.0000 | 1.0000 | 91.20 |
| 13.5 | 5,845,006 | | 0.0000 | 1.0000 | 91.20 |
| 14.5 | 5,845,006 | | 0.0000 | 1.0000 | 91.20 |
| 15.5 | 5,845,006 | | 0.0000 | 1.0000 | 91.20 |
| 16.5 | 5,845,006 | 3,817 | 0.0007 | 0.9993 | 91.20 |
| 17.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 18.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 19.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 20.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 21.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 22.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 23.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 24.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 25.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 26.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 27.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 28.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 29.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 30.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 31.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 32.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 33.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 34.5 | 5,841,189 | | 0.0000 | 1.0000 | 91.14 |
| 35.5 | 3,169,983 | | 0.0000 | 1.0000 | 91.14 |
| 36.5 | 2,062,600 | | 0.0000 | 1.0000 | 91.14 |
| 37.5 | 2,062,600 | | 0.0000 | 1.0000 | 91.14 |
| 38.5 | 2,062,600 | | 0.0000 | 1.0000 | 91.14 |

NEWFOUNDLAND AND LABRADOR HYDRO

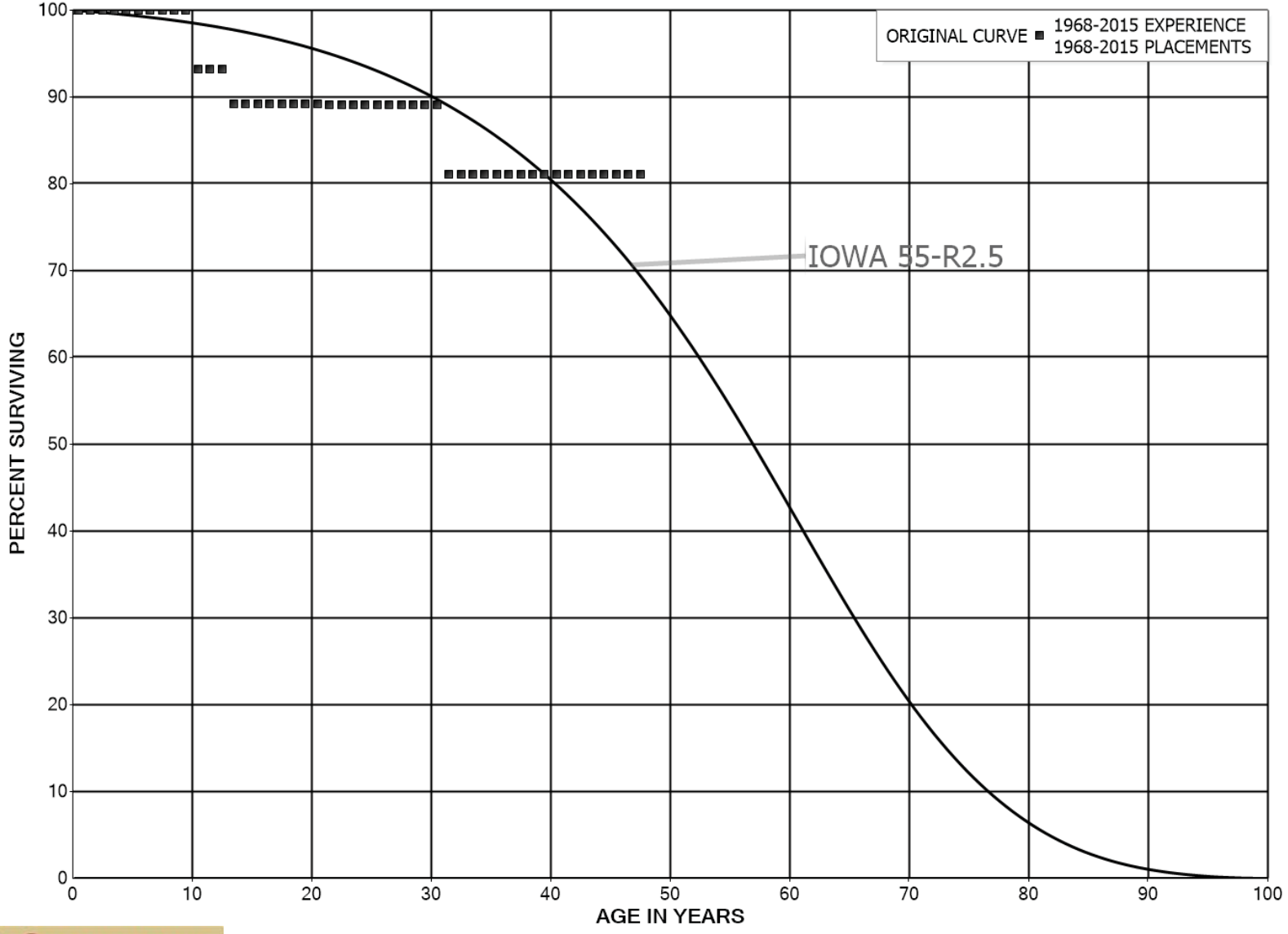
ACCOUNT W03 - WATER SYSTEMS - FEED

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 2,062,600 | | 0.0000 | 1.0000 | 91.14 |
| 40.5 | 2,062,600 | | 0.0000 | 1.0000 | 91.14 |
| 41.5 | 2,062,600 | | 0.0000 | 1.0000 | 91.14 |
| 42.5 | 2,062,600 | | 0.0000 | 1.0000 | 91.14 |
| 43.5 | 2,062,600 | | 0.0000 | 1.0000 | 91.14 |
| 44.5 | 329,755 | | 0.0000 | 1.0000 | 91.14 |
| 45.5 | 329,755 | | 0.0000 | 1.0000 | 91.14 |
| 46.5 | 329,755 | | 0.0000 | 1.0000 | 91.14 |
| 47.5 | | | | | 91.14 |

NEWFOUNDLAND AND LABRADOR HYDRO
ACCOUNT W04 - WATER TREATMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W04 - WATER TREATMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 0.0 | 16,019,602 | | 0.0000 | 1.0000 | 100.00 |
| 0.5 | 11,859,599 | | 0.0000 | 1.0000 | 100.00 |
| 1.5 | 11,859,599 | | 0.0000 | 1.0000 | 100.00 |
| 2.5 | 11,542,239 | | 0.0000 | 1.0000 | 100.00 |
| 3.5 | 10,882,444 | | 0.0000 | 1.0000 | 100.00 |
| 4.5 | 9,464,291 | | 0.0000 | 1.0000 | 100.00 |
| 5.5 | 9,464,291 | | 0.0000 | 1.0000 | 100.00 |
| 6.5 | 9,464,291 | | 0.0000 | 1.0000 | 100.00 |
| 7.5 | 9,464,291 | | 0.0000 | 1.0000 | 100.00 |
| 8.5 | 9,464,291 | | 0.0000 | 1.0000 | 100.00 |
| 9.5 | 9,464,291 | 642,386 | 0.0679 | 0.9321 | 100.00 |
| 10.5 | 8,821,905 | | 0.0000 | 1.0000 | 93.21 |
| 11.5 | 8,821,905 | | 0.0000 | 1.0000 | 93.21 |
| 12.5 | 8,821,905 | 380,586 | 0.0431 | 0.9569 | 93.21 |
| 13.5 | 8,441,318 | | 0.0000 | 1.0000 | 89.19 |
| 14.5 | 8,441,318 | | 0.0000 | 1.0000 | 89.19 |
| 15.5 | 8,441,318 | | 0.0000 | 1.0000 | 89.19 |
| 16.5 | 8,441,318 | | 0.0000 | 1.0000 | 89.19 |
| 17.5 | 8,441,318 | | 0.0000 | 1.0000 | 89.19 |
| 18.5 | 6,032,194 | | 0.0000 | 1.0000 | 89.19 |
| 19.5 | 5,807,399 | | 0.0000 | 1.0000 | 89.19 |
| 20.5 | 5,792,685 | 8,799 | 0.0015 | 0.9985 | 89.19 |
| 21.5 | 5,783,887 | 563 | 0.0001 | 0.9999 | 89.06 |
| 22.5 | 5,783,324 | | 0.0000 | 1.0000 | 89.05 |
| 23.5 | 5,783,324 | | 0.0000 | 1.0000 | 89.05 |
| 24.5 | 3,102,160 | | 0.0000 | 1.0000 | 89.05 |
| 25.5 | 3,087,023 | | 0.0000 | 1.0000 | 89.05 |
| 26.5 | 3,087,023 | | 0.0000 | 1.0000 | 89.05 |
| 27.5 | 3,029,481 | | 0.0000 | 1.0000 | 89.05 |
| 28.5 | 3,029,481 | | 0.0000 | 1.0000 | 89.05 |
| 29.5 | 3,029,481 | | 0.0000 | 1.0000 | 89.05 |
| 30.5 | 3,029,481 | 272,733 | 0.0900 | 0.9100 | 89.05 |
| 31.5 | 2,756,748 | | 0.0000 | 1.0000 | 81.03 |
| 32.5 | 2,737,925 | | 0.0000 | 1.0000 | 81.03 |
| 33.5 | 2,737,925 | | 0.0000 | 1.0000 | 81.03 |
| 34.5 | 2,737,925 | | 0.0000 | 1.0000 | 81.03 |
| 35.5 | 2,115,562 | | 0.0000 | 1.0000 | 81.03 |
| 36.5 | 2,110,464 | | 0.0000 | 1.0000 | 81.03 |
| 37.5 | 2,110,464 | | 0.0000 | 1.0000 | 81.03 |
| 38.5 | 2,110,464 | | 0.0000 | 1.0000 | 81.03 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W04 - WATER TREATMENT

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1968-2015 EXPERIENCE BAND 1968-2015

| AGE AT BEGIN OF INTERVAL | EXPOSURES AT BEGINNING OF AGE INTERVAL | RETIREMENTS DURING AGE INTERVAL | RETMT RATIO | SURV RATIO | PCT SURV BEGIN OF INTERVAL |
|---|---|---|---|---|---|
| 39.5 | 2,110,464 | | 0.0000 | 1.0000 | 81.03 |
| 40.5 | 2,110,464 | | 0.0000 | 1.0000 | 81.03 |
| 41.5 | 2,110,464 | | 0.0000 | 1.0000 | 81.03 |
| 42.5 | 2,110,464 | | 0.0000 | 1.0000 | 81.03 |
| 43.5 | 2,110,464 | | 0.0000 | 1.0000 | 81.03 |
| 44.5 | 1,905,927 | | 0.0000 | 1.0000 | 81.03 |
| 45.5 | 1,905,927 | | 0.0000 | 1.0000 | 81.03 |
| 46.5 | 65,708 | | 0.0000 | 1.0000 | 81.03 |
| 47.5 | | | | | 81.03 |

# PART VI. DEPRECIATION CALCULATIONS

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT A01 - AIRCRAFT LANDING STRIP

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 33-R2 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1974 | 7,976.40 | 6,995 | 8,455 | | | |
| 1993 | 192,208.10 | 110,576 | 202,845 | 896 | 15.09 | 59 |
| 1994 | 194,620.58 | 107,774 | 197,704 | 8,594 | 15.76 | 545 |
| 2006 | 78,390.03 | 20,723 | 38,015 | 45,078 | 24.77 | 1,820 |
| 2015 | 2,302.95 | 54 | 99 | 2,342 | 22.02 | 106 |
| | 475,498.06 | 246,122 | 447,118 | 56,910 | | 2,530 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 22.5 0.53

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT A04 - AUXILIARY POWER SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 30-R4 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1956 | 85,469.97 | 88,034 | 88,034 | | | |
| 1966 | 283,631.50 | 292,140 | 292,140 | | | |
| 1970 | 12,000.00 | 12,327 | 12,360 | | | |
| 1974 | 5,049.52 | 5,045 | 5,201 | | | |
| 1978 | 2,000.00 | 1,930 | 2,060 | | | |
| 1979 | 99,773.88 | 95,368 | 102,767 | | | |
| 1980 | 135,560.00 | 128,271 | 139,092 | 535 | 2.44 | 219 |
| 1982 | 413,537.76 | 382,783 | 415,075 | 10,869 | 3.04 | 3,575 |
| 1983 | 43,498.13 | 39,755 | 43,109 | 1,694 | 3.38 | 501 |
| 1984 | 221,073.63 | 199,243 | 216,051 | 11,655 | 3.75 | 3,108 |
| 1988 | 165,905.06 | 138,300 | 149,967 | 20,915 | 5.72 | 3,656 |
| 1989 | 680,140.87 | 552,499 | 599,108 | 101,437 | 6.34 | 16,000 |
| 1992 | 63,724.33 | 47,280 | 51,269 | 14,367 | 8.39 | 1,712 |
| 1999 | 16,056.11 | 8,815 | 9,559 | 6,979 | 14.01 | 498 |
| 2000 | 164,084.55 | 85,011 | 92,183 | 76,824 | 14.91 | 5,153 |
| 2001 | 368,268.81 | 179,292 | 194,417 | 184,900 | 15.82 | 11,688 |
| 2003 | 448,397.32 | 189,511 | 205,498 | 256,351 | 17.69 | 14,491 |
| 2005 | 97,542.86 | 34,830 | 37,768 | 62,701 | 19.60 | 3,199 |
| 2010 | 336,595.37 | 63,330 | 68,673 | 278,020 | 24.52 | 11,338 |
| 2011 | 59,826.71 | 9,223 | 10,001 | 51,621 | 25.51 | 2,024 |
| 2012 | 213,015.53 | 25,523 | 27,676 | 191,730 | 26.51 | 7,232 |
| 2013 | 802,476.86 | 68,877 | 74,688 | 751,863 | 27.50 | 27,340 |
| 2015 | 1,337,310.13 | 24,518 | 26,586 | 1,350,843 | 27.67 | 48,820 |
| | 6,054,938.90 | 2,671,905 | 2,863,282 | 3,373,305 | | 160,554 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 21.0 2.65

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B01 - BATTERY AND POWER SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 26-L1.5 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1956 | 1,465.79 | 1,289 | 1,510 | | | |
| 1968 | 46,703.90 | 37,096 | 48,105 | | | |
| 1970 | 3,635.52 | 2,827 | 3,745 | | | |
| 1971 | 61,437.84 | 47,266 | 63,281 | | | |
| 1972 | 17,191.24 | 13,076 | 17,707 | | | |
| 1973 | 351.12 | 264 | 362 | | | |
| 1975 | 6,046.84 | 4,439 | 6,228 | | | |
| 1978 | 39,546.11 | 27,902 | 40,732 | | | |
| 1979 | 8,963.00 | 6,235 | 9,232 | | | |
| 1980 | 309,979.19 | 212,566 | 319,279 | | | |
| 1982 | 78,356.38 | 52,149 | 80,707 | | | |
| 1985 | 112,621.82 | 71,519 | 116,000 | | | |
| 1987 | 2,173.59 | 1,335 | 2,239 | | | |
| 1988 | 6,546.56 | 3,952 | 6,743 | | | |
| 1989 | 13,813.16 | 8,192 | 14,228 | | | |
| 1990 | 281,180.21 | 163,743 | 289,616 | | | |
| 1992 | 165,114.78 | 92,556 | 165,623 | 4,445 | 11.85 | 375 |
| 1994 | 25,099.57 | 13,493 | 24,145 | 1,708 | 12.43 | 137 |
| 1995 | 71,903.31 | 37,771 | 67,589 | 6,471 | 12.74 | 508 |
| 1996 | 182,381.97 | 93,493 | 167,300 | 20,553 | 13.06 | 1,574 |
| 1997 | 11,760.26 | 5,870 | 10,504 | 1,609 | 13.40 | 120 |
| 1998 | 189,198.12 | 91,665 | 164,029 | 30,845 | 13.77 | 2,240 |
| 1999 | 20,241.49 | 9,494 | 16,989 | 3,860 | 14.16 | 273 |
| 2000 | 184,734.09 | 83,503 | 149,423 | 40,853 | 14.59 | 2,800 |
| 2001 | 849,065.18 | 368,652 | 659,680 | 214,857 | 15.04 | 14,286 |
| 2002 | 6,611.36 | 2,742 | 4,907 | 1,903 | 15.53 | 123 |
| 2003 | 1,372,752.91 | 540,010 | 966,315 | 447,620 | 16.07 | 27,854 |
| 2004 | 425,839.87 | 157,735 | 282,257 | 156,358 | 16.65 | 9,391 |
| 2005 | 436,123.50 | 150,655 | 269,588 | 179,619 | 17.28 | 10,395 |
| 2006 | 400,764.27 | 127,807 | 228,703 | 184,084 | 17.95 | 10,255 |
| 2007 | 482,048.57 | 140,170 | 250,826 | 245,684 | 18.66 | 13,166 |
| 2008 | 358,693.69 | 93,786 | 167,824 | 201,631 | 19.40 | 10,393 |
| 2009 | 766,844.06 | 176,808 | 316,387 | 473,462 | 20.18 | 23,462 |
| 2010 | 559,022.38 | 110,950 | 198,538 | 377,255 | 20.99 | 17,973 |
| 2011 | 707,836.53 | 116,929 | 209,237 | 519,835 | 21.83 | 23,813 |
| 2012 | 1,212,344.62 | 158,012 | 282,753 | 965,962 | 22.71 | 42,535 |
| 2013 | 761,528.57 | 71,802 | 128,485 | 655,889 | 23.62 | 27,768 |
| 2014 | 380,909.69 | 21,728 | 38,881 | 353,456 | 24.56 | 14,392 |
| 2015 | 839,165.25 | 23,596 | 42,224 | 822,117 | 17.82 | 46,135 |
| | 11,399,996.31 | 3,343,077 | 5,831,921 | 5,910,076 | | 299,968 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 19.7 2.63

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B02 - BOILER SYSTEM

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 40-R3 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1968 | 14,985,641.26 | 14,088,601 | 16,184,493 | | | |
| 1971 | 795,588.25 | 726,269 | 859,235 | | | |
| 1979 | 2,040.12 | 1,660 | 2,082 | 121 | 9.86 | 12 |
| 1981 | 314,253.38 | 245,976 | 308,543 | 30,851 | 11.01 | 2,802 |
| 1982 | 68,031.30 | 52,130 | 65,390 | 8,084 | 11.62 | 696 |
| 1986 | 142,517.51 | 99,085 | 124,288 | 29,631 | 14.25 | 2,079 |
| 1987 | 29,961.22 | 20,264 | 25,418 | 6,940 | 14.95 | 464 |
| 1988 | 480,335.28 | 315,537 | 395,798 | 122,964 | 15.67 | 7,847 |
| 1989 | 4,309,160.53 | 2,745,797 | 3,444,223 | 1,209,670 | 16.40 | 73,760 |
| 1993 | 184,491.61 | 102,216 | 128,216 | 71,035 | 19.48 | 3,647 |
| 1996 | 19,423.10 | 9,476 | 11,886 | 9,091 | 21.93 | 415 |
| 1997 | 53,585.52 | 24,914 | 31,251 | 26,621 | 22.78 | 1,169 |
| 1999 | 92,545.14 | 38,755 | 48,613 | 51,336 | 24.49 | 2,096 |
| 2007 | 1,855,849.81 | 412,388 | 517,284 | 1,487,034 | 31.77 | 46,806 |
| 2014 | 542,621.76 | 21,537 | 27,015 | 559,016 | 38.53 | 14,509 |
| | 23,876,045.79 | 18,904,605 | 22,173,735 | 3,612,394 | | 156,302 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 23.1 0.65

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B03 - BOOMS - TIMBER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 25-R2 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1966 | 38,209.00 | 38,209 | 38,209 | | | |
| 1970 | 1,982.00 | 1,962 | 1,275 | 707 | 0.25 | 707 |
| 1979 | 46,793.75 | 41,646 | 27,067 | 19,727 | 2.75 | 7,173 |
| 2014 | 37,008.66 | 1,998 | 1,299 | 35,710 | 23.65 | 1,510 |
| 2015 | 51,562.11 | 1,485 | 965 | 50,597 | 16.89 | 2,996 |
| | 175,555.52 | 85,300 | 68,815 | 106,740 | | 12,386 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 8.6 7.06

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B04 - BRIDGES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-R4 | | | | | | |
| NET SALVAGE PERCENT.. -11 | | | | | | |
| 1966 | 564,791.18 | 441,739 | 626,918 | | | |
| 1980 | 221,425.80 | 130,152 | 220,742 | 25,041 | 30.58 | 819 |
| 1983 | 26,746.98 | 14,488 | 24,572 | 5,117 | 33.28 | 154 |
| 1984 | 1,988,230.31 | 1,045,756 | 1,773,639 | 433,297 | 34.20 | 12,670 |
| 1992 | 629,308.12 | 249,858 | 423,768 | 274,764 | 41.75 | 6,581 |
| 1994 | 55,564.63 | 20,221 | 34,295 | 27,382 | 43.69 | 627 |
| 1996 | 36,386.80 | 12,030 | 20,403 | 19,986 | 45.64 | 438 |
| 1997 | 63,600.25 | 19,963 | 33,858 | 36,738 | 46.62 | 788 |
| 2003 | 312,030.06 | 66,392 | 112,603 | 233,750 | 52.54 | 4,449 |
| 2007 | 337,011.43 | 48,803 | 82,772 | 291,311 | 56.52 | 5,154 |
| 2011 | 19,193.98 | 1,472 | 2,497 | 18,809 | 60.51 | 311 |
| | 4,254,289.54 | 2,050,874 | 3,356,067 | 1,366,195 | | 31,991 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 42.7 0.75

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B05 - BUILDINGS - OTHER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 50-R0.5 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1967 | 321,303.14 | 183,276 | 330,942 | | | |
| 1968 | 1,704,287.55 | 954,946 | 1,755,416 | | | |
| 1969 | 102,525.34 | 56,412 | 105,601 | | | |
| 1970 | 122,471.07 | 66,125 | 126,145 | | | |
| 1971 | 49,280.73 | 26,090 | 50,759 | | | |
| 1972 | 63,651.61 | 33,043 | 65,561 | | | |
| 1973 | 277,231.53 | 140,947 | 285,548 | | | |
| 1974 | 25,512.63 | 12,703 | 26,278 | | | |
| 1975 | 904,839.77 | 440,829 | 915,239 | 16,746 | 26.35 | 636 |
| 1977 | 436,824.10 | 203,278 | 422,041 | 27,888 | 27.41 | 1,017 |
| 1978 | 16,205.52 | 7,364 | 15,289 | 1,403 | 27.94 | 50 |
| 1979 | 132,860.64 | 58,899 | 122,285 | 14,561 | 28.48 | 511 |
| 1980 | 607,564.93 | 262,582 | 545,167 | 80,625 | 29.02 | 2,778 |
| 1981 | 187,623.82 | 78,963 | 163,941 | 29,312 | 29.57 | 991 |
| 1982 | 894,510.05 | 366,327 | 760,560 | 160,785 | 30.12 | 5,338 |
| 1983 | 117,158.22 | 46,628 | 96,808 | 23,865 | 30.68 | 778 |
| 1984 | 251,476.43 | 97,185 | 201,773 | 57,248 | 31.24 | 1,833 |
| 1985 | 222,466.52 | 83,407 | 173,168 | 55,973 | 31.80 | 1,760 |
| 1986 | 500,259.66 | 181,786 | 377,420 | 137,847 | 32.36 | 4,260 |
| 1987 | 1,246,537.52 | 438,335 | 910,061 | 373,873 | 32.93 | 11,354 |
| 1988 | 254,576.87 | 86,478 | 179,544 | 82,670 | 33.51 | 2,467 |
| 1989 | 21,449,089.59 | 7,034,272 | 14,604,392 | 7,488,170 | 34.08 | 219,723 |
| 1990 | 1,708,283.45 | 539,824 | 1,120,770 | 638,762 | 34.66 | 18,429 |
| 1991 | 136,545.27 | 41,517 | 86,197 | 54,445 | 35.24 | 1,545 |
| 1992 | 223,784.38 | 65,369 | 135,718 | 94,780 | 35.82 | 2,646 |
| 1993 | 144,816.43 | 40,542 | 84,172 | 64,989 | 36.41 | 1,785 |
| 1994 | 493,681.26 | 132,208 | 274,487 | 234,005 | 37.00 | 6,324 |
| 1995 | 562,879.15 | 143,898 | 298,758 | 281,008 | 37.59 | 7,476 |
| 1996 | 1,063,005.55 | 258,833 | 537,383 | 557,513 | 38.18 | 14,602 |
| 1997 | 946,089.64 | 218,866 | 454,404 | 520,068 | 38.77 | 13,414 |
| 1998 | 60,623.02 | 13,288 | 27,588 | 34,854 | 39.36 | 886 |
| 1999 | 363,208.48 | 75,120 | 155,962 | 218,143 | 39.96 | 5,459 |
| 2000 | 536,570.67 | 104,344 | 216,637 | 336,031 | 40.56 | 8,285 |
| 2001 | 2,025,328.99 | 368,821 | 765,738 | 1,320,351 | 41.16 | 32,078 |
| 2002 | 39,901.19 | 6,773 | 14,062 | 27,036 | 41.76 | 647 |
| 2003 | 3,414,776.99 | 537,431 | 1,115,802 | 2,401,418 | 42.36 | 56,691 |
| 2004 | 667,419.28 | 96,792 | 200,957 | 486,485 | 42.96 | 11,324 |
| 2005 | 1,137,562.52 | 150,914 | 313,324 | 858,365 | 43.56 | 19,705 |
| 2006 | 4,506,177.04 | 541,183 | 1,123,592 | 3,517,770 | 44.17 | 79,642 |
| 2007 | 967,374.99 | 104,024 | 215,972 | 780,424 | 44.78 | 17,428 |
| 2008 | 839,316.47 | 79,879 | 165,843 | 698,653 | 45.38 | 15,396 |
| 2009 | 873,943.37 | 72,193 | 149,885 | 750,277 | 45.99 | 16,314 |
| 2010 | 6,581,913.04 | 459,641 | 954,296 | 5,825,074 | 46.61 | 124,975 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B05 - BUILDINGS - OTHER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 50-R0.5 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 2011 | 3,558,651.72 | 203,797 | 423,119 | 3,242,292 | 47.22 | 68,664 |
| 2012 | 2,120,456.52 | 94,789 | 196,799 | 1,987,271 | 47.83 | 41,549 |
| 2013 | 1,748,268.28 | 55,822 | 115,896 | 1,684,820 | 48.45 | 34,774 |
| 2014 | 2,301,553.82 | 44,093 | 91,545 | 2,279,055 | 49.07 | 46,445 |
| 2015 | 2,266,372.60 | 56,492 | 117,287 | 2,217,077 | 20.12 | 110,193 |
| | 69,176,761.36 | 15,366,328 | 31,590,131 | 39,661,933 | | 1,010,172 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 39.3 1.46

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B06 - BUILDINGS - METAL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R3 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1965 | 496,680.62 | 387,037 | 511,581 | | | |
| 1966 | 284,920.26 | 219,088 | 293,468 | | | |
| 1967 | 796,275.99 | 603,789 | 820,164 | | | |
| 1968 | 1,348,322.58 | 1,007,485 | 1,388,772 | | | |
| 1969 | 1,344,302.45 | 989,125 | 1,384,632 | | | |
| 1970 | 147,186.08 | 106,617 | 151,602 | | | |
| 1971 | 700,196.43 | 498,812 | 721,202 | | | |
| 1975 | 551,697.72 | 365,435 | 544,365 | 23,884 | 19.63 | 1,217 |
| 1976 | 311,245.64 | 202,083 | 301,030 | 19,553 | 20.33 | 962 |
| 1977 | 113,072.12 | 71,911 | 107,121 | 9,343 | 21.04 | 444 |
| 1978 | 684,309.29 | 425,849 | 634,360 | 70,479 | 21.77 | 3,237 |
| 1979 | 247,825.70 | 150,836 | 224,691 | 30,569 | 22.50 | 1,359 |
| 1980 | 3,138,866.66 | 1,866,333 | 2,780,157 | 452,876 | 23.25 | 19,479 |
| 1981 | 584,160.14 | 339,019 | 505,015 | 96,670 | 24.01 | 4,026 |
| 1982 | 1,925,035.45 | 1,089,819 | 1,623,433 | 359,354 | 24.77 | 14,508 |
| 1983 | 1,399,100.34 | 771,623 | 1,149,437 | 291,636 | 25.55 | 11,414 |
| 1984 | 408,162.84 | 219,070 | 326,335 | 94,073 | 26.34 | 3,571 |
| 1985 | 87,197.01 | 45,495 | 67,771 | 22,042 | 27.14 | 812 |
| 1986 | 16,689.87 | 8,458 | 12,599 | 4,592 | 27.94 | 164 |
| 1987 | 284,222.63 | 139,668 | 208,054 | 84,695 | 28.76 | 2,945 |
| 1988 | 435,449.77 | 207,213 | 308,672 | 139,841 | 29.59 | 4,726 |
| 1989 | 146,934.65 | 67,637 | 100,755 | 50,588 | 30.42 | 1,663 |
| 1990 | 1,575,617.29 | 700,502 | 1,043,493 | 579,393 | 31.26 | 18,535 |
| 1991 | 1,490,557.45 | 638,950 | 951,803 | 583,471 | 32.11 | 18,171 |
| 1992 | 932,441.26 | 384,694 | 573,054 | 387,360 | 32.97 | 11,749 |
| 1993 | 491,155.09 | 194,631 | 289,929 | 215,961 | 33.84 | 6,382 |
| 1994 | 11,845.40 | 4,499 | 6,702 | 5,499 | 34.72 | 158 |
| 1995 | 103,615.40 | 37,645 | 56,077 | 50,647 | 35.60 | 1,423 |
| 1996 | 510,264.42 | 176,881 | 263,488 | 262,084 | 36.49 | 7,182 |
| 1998 | 176,530.51 | 55,210 | 82,243 | 99,583 | 38.30 | 2,600 |
| 2001 | 110,073.41 | 28,735 | 42,805 | 70,571 | 41.06 | 1,719 |
| 2002 | 780,974.95 | 190,282 | 283,451 | 520,953 | 41.99 | 12,407 |
| 2003 | 166,852.30 | 37,714 | 56,180 | 115,678 | 42.93 | 2,695 |
| 2004 | 50,241.99 | 10,472 | 15,599 | 36,150 | 43.87 | 824 |
| 2005 | 284,953.12 | 54,377 | 81,002 | 212,500 | 44.81 | 4,742 |
| 2007 | 49,389.10 | 7,659 | 11,409 | 39,462 | 46.72 | 845 |
| 2008 | 17,818.02 | 2,439 | 3,633 | 14,720 | 47.69 | 309 |
| 2009 | 75,434.91 | 8,970 | 13,362 | 64,336 | 48.65 | 1,322 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B06 - BUILDINGS - METAL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R3 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 2011 | 31,646.84 | 2,614 | 3,894 | 28,702 | 50.59 | 567 |
| 2014 | 889,193.02 | 24,646 | 36,714 | 879,155 | 53.52 | 16,427 |
| 2015 | 10,828,614.63 | 120,458 | 179,439 | 10,974,035 | 46.01 | 238,514 |
| | 34,029,073.35 | 12,463,780 | 18,159,493 | 16,890,453 | | 417,098 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 40.5 1.23

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B07 - BUS DUCT GENERATOR

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 40-R4 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1968 | 27,238.00 | 25,804 | 28,055 | | | |
| 1980 | 311,717.00 | 254,045 | 285,957 | 35,112 | 8.35 | 4,205 |
| 1988 | 120,878.46 | 80,710 | 90,848 | 33,657 | 14.07 | 2,392 |
| 2003 | 365,970.58 | 116,854 | 131,533 | 245,417 | 27.60 | 8,892 |
| 2015 | 630,303.53 | 8,635 | 9,720 | 639,493 | 37.09 | 17,242 |
| | 1,456,107.57 | 486,048 | 546,113 | 953,678 | | 32,731 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 29.1 2.25

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B08 - BUSWORK AND HARDWARE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 50-R4 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1967 | 268,547.91 | 243,337 | 290,032 | | | |
| 1968 | 104,589.03 | 93,573 | 112,956 | | | |
| 1969 | 18,000.00 | 15,886 | 19,231 | 209 | 9.14 | 23 |
| 1970 | 521,630.42 | 453,618 | 549,137 | 14,224 | 9.74 | 1,460 |
| 1974 | 8,694.70 | 7,071 | 8,560 | 830 | 12.35 | 67 |
| 1975 | 68,040.25 | 54,319 | 65,757 | 7,726 | 13.04 | 592 |
| 1976 | 2,298.22 | 1,800 | 2,179 | 303 | 13.74 | 22 |
| 1977 | 238,137.96 | 182,810 | 221,304 | 35,885 | 14.46 | 2,482 |
| 1978 | 322,711.68 | 242,576 | 293,655 | 54,874 | 15.20 | 3,610 |
| 1979 | 155,744.87 | 114,547 | 138,667 | 29,537 | 15.95 | 1,852 |
| 1980 | 132,765.41 | 95,467 | 115,570 | 27,817 | 16.71 | 1,665 |
| 1981 | 212,209.10 | 149,017 | 180,396 | 48,790 | 17.49 | 2,790 |
| 1982 | 238,384.77 | 163,278 | 197,660 | 59,796 | 18.29 | 3,269 |
| 1983 | 166,412.59 | 111,070 | 134,458 | 45,268 | 19.10 | 2,370 |
| 1985 | 23,798.53 | 15,031 | 18,196 | 7,506 | 20.76 | 362 |
| 1986 | 84,174.63 | 51,618 | 62,487 | 28,422 | 21.61 | 1,315 |
| 1987 | 110,667.31 | 65,784 | 79,636 | 39,885 | 22.48 | 1,774 |
| 1988 | 22,543.64 | 12,972 | 15,704 | 8,643 | 23.36 | 370 |
| 1989 | 400,025.39 | 222,494 | 269,345 | 162,682 | 24.25 | 6,709 |
| 1990 | 150,841.82 | 80,966 | 98,015 | 64,894 | 25.15 | 2,580 |
| 1991 | 707,463.50 | 365,832 | 442,865 | 321,196 | 26.06 | 12,325 |
| 1992 | 555,332.55 | 276,129 | 334,274 | 265,485 | 26.98 | 9,840 |
| 1993 | 33,128.06 | 15,807 | 19,135 | 16,643 | 27.91 | 596 |
| 1994 | 149,377.90 | 68,242 | 82,612 | 78,716 | 28.85 | 2,728 |
| 1995 | 465,654.41 | 203,275 | 246,079 | 256,828 | 29.79 | 8,621 |
| 1996 | 98,866.85 | 41,109 | 49,765 | 57,011 | 30.75 | 1,854 |
| 1997 | 55,916.37 | 22,091 | 26,743 | 33,647 | 31.71 | 1,061 |
| 1998 | 326,389.45 | 122,177 | 147,904 | 204,597 | 32.67 | 6,263 |
| 2000 | 299,484.25 | 99,491 | 120,441 | 203,002 | 34.62 | 5,864 |
| 2002 | 48,570.45 | 14,079 | 17,044 | 35,412 | 36.58 | 968 |
| 2003 | 37,106.47 | 9,971 | 12,071 | 28,004 | 37.56 | 746 |
| 2004 | 112,224.95 | 27,755 | 33,599 | 87,604 | 38.55 | 2,272 |
| 2005 | 6,333.49 | 1,431 | 1,732 | 5,108 | 39.54 | 129 |
| 2009 | 33,674.74 | 4,721 | 5,715 | 30,654 | 43.51 | 705 |
| 2012 | 1,035,536.04 | 78,287 | 94,771 | 1,023,608 | 46.50 | 22,013 |
| 2014 | 46,222.92 | 1,498 | 1,814 | 48,107 | 48.50 | 992 |
| 2015 | 46,405.63 | 531 | 643 | 49,476 | 46.45 | 1,065 |
| | 7,307,906.26 | 3,729,660 | 4,510,152 | 3,382,387 | | 111,354 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 30.4 1.52

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C01 - CABLES - TELECONTROL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 30-R4 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1982 | 12,612.10 | 11,674 | 12,990 | | | |
| 1993 | 112,541.10 | 80,678 | 115,917 | | | |
| 1999 | 176,607.97 | 96,956 | 181,906 | | | |
| 2000 | 22,031.28 | 11,414 | 22,692 | | | |
| 2001 | 129,578.38 | 63,085 | 133,466 | | | |
| 2002 | 260,377.55 | 118,451 | 268,189 | | | |
| 2003 | 892,247.63 | 377,099 | 919,015 | | | |
| 2010 | 99,451.25 | 18,712 | 90,721 | 11,714 | 24.52 | 478 |
| 2012 | 923,499.09 | 110,654 | 536,484 | 414,720 | 26.51 | 15,644 |
| 2013 | 11,851.59 | 1,017 | 4,931 | 7,276 | 27.50 | 265 |
| 2015 | 2,541.47 | 47 | 228 | 2,390 | 27.67 | 86 |
| | 2,643,339.41 | 889,787 | 2,286,539 | 436,101 | | 16,473 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 26.5 0.62

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C02 - CABLE - SUBMARINE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 45-R4 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1975 | 475,796.93 | 433,444 | 501,133 | 41,276 | 9.04 | 4,566 |
| 1980 | 169,115.97 | 139,624 | 161,428 | 31,364 | 12.41 | 2,527 |
| 1982 | 123,400.69 | 97,348 | 112,550 | 28,127 | 13.86 | 2,029 |
| 1988 | 1,550,390.96 | 1,035,334 | 1,197,018 | 570,428 | 18.64 | 30,602 |
| 1989 | 2,453,451.52 | 1,585,554 | 1,833,163 | 963,772 | 19.49 | 49,450 |
| 1990 | 2,979,349.00 | 1,859,764 | 2,150,196 | 1,246,262 | 20.36 | 61,211 |
| 1999 | 922,348.37 | 381,339 | 440,891 | 610,586 | 28.68 | 21,290 |
| 2007 | 104,280.98 | 22,376 | 25,870 | 93,010 | 36.53 | 2,546 |
| 2008 | 42,294.63 | 8,014 | 9,266 | 38,950 | 37.52 | 1,038 |
| 2009 | 80,687.42 | 13,266 | 15,337 | 76,646 | 38.51 | 1,990 |
| | 8,901,116.47 | 5,576,063 | 6,446,852 | 3,700,420 | | 177,249 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 20.9 1.99

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C03- CABLES - UNDERGROUND

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 60-S4 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1967 | 67,835.10 | 59,069 | 68,848 | 8,484 | 14.17 | 599 |
| 1968 | 67,096.88 | 57,584 | 67,117 | 9,373 | 14.83 | 632 |
| 1970 | 135,075.57 | 112,307 | 130,899 | 23,087 | 16.24 | 1,422 |
| 1971 | 28,808.00 | 23,547 | 27,445 | 5,396 | 16.98 | 318 |
| 1972 | 12,861.35 | 10,324 | 12,033 | 2,629 | 17.75 | 148 |
| 1975 | 15,303.23 | 11,569 | 13,484 | 3,962 | 20.21 | 196 |
| 1976 | 3,697.85 | 2,735 | 3,188 | 1,028 | 21.07 | 49 |
| 1977 | 6,782.66 | 4,902 | 5,714 | 2,018 | 21.96 | 92 |
| 1978 | 85,112.12 | 60,060 | 70,003 | 27,025 | 22.86 | 1,182 |
| 1979 | 84,286.46 | 58,005 | 67,607 | 28,480 | 23.78 | 1,198 |
| 1980 | 62,069.93 | 41,619 | 48,509 | 22,251 | 24.71 | 900 |
| 1981 | 47,782.87 | 31,176 | 36,337 | 18,135 | 25.66 | 707 |
| 1982 | 99,352.11 | 63,011 | 73,442 | 39,819 | 26.62 | 1,496 |
| 1983 | 33,221.24 | 20,457 | 23,844 | 14,028 | 27.59 | 508 |
| 1987 | 44,595.82 | 24,132 | 28,127 | 22,712 | 31.52 | 721 |
| 1989 | 77,293.50 | 38,903 | 45,343 | 42,772 | 33.51 | 1,276 |
| 1990 | 80,930.60 | 39,211 | 45,702 | 46,559 | 34.50 | 1,350 |
| 1991 | 94,095.94 | 43,801 | 51,052 | 56,217 | 35.50 | 1,584 |
| 1992 | 52,174.86 | 23,296 | 27,153 | 32,326 | 36.50 | 886 |
| 1993 | 6,622.24 | 2,831 | 3,300 | 4,249 | 37.50 | 113 |
| 1995 | 166,037.71 | 64,672 | 75,378 | 113,905 | 39.50 | 2,884 |
| 1996 | 9,885.30 | 3,663 | 4,269 | 7,000 | 40.50 | 173 |
| 1998 | 22,326.20 | 7,424 | 8,653 | 16,799 | 42.50 | 395 |
| 2000 | 68,281.30 | 20,109 | 23,438 | 54,403 | 44.50 | 1,223 |
| 2001 | 17,652.00 | 4,863 | 5,668 | 14,455 | 45.50 | 318 |
| 2012 | 323,501.29 | 21,512 | 25,073 | 343,718 | 56.50 | 6,084 |
| 2013 | 109,168.13 | 5,186 | 6,045 | 118,407 | 57.50 | 2,059 |
| 2014 | 464,890.58 | 13,249 | 15,442 | 514,533 | 58.50 | 8,795 |
| 2015 | 550,805.10 | 5,400 | 6,294 | 621,623 | 57.64 | 10,785 |
| | 2,837,545.94 | 874,617 | 1,019,407 | 2,215,395 | | 48,093 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 46.1 1.69

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C04 - CABLES - ABOVE GROUND

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 60-R4 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1967 | 176,785.73 | 148,733 | 187,166 | 14,370 | 15.72 | 914 |
| 1968 | 631,767.69 | 523,114 | 658,290 | 61,925 | 16.42 | 3,771 |
| 1970 | 331,759.42 | 265,565 | 334,189 | 44,017 | 17.87 | 2,463 |
| 1971 | 193,228.00 | 151,956 | 191,222 | 29,058 | 18.61 | 1,561 |
| 1973 | 1,019.00 | 772 | 971 | 191 | 20.13 | 9 |
| 1974 | 55,053.53 | 40,889 | 51,455 | 11,306 | 20.91 | 541 |
| 1975 | 13,512.29 | 9,830 | 12,370 | 3,034 | 21.71 | 140 |
| 1976 | 18,193.77 | 12,960 | 16,309 | 4,432 | 22.51 | 197 |
| 1977 | 117,653.40 | 81,973 | 103,155 | 30,970 | 23.33 | 1,327 |
| 1978 | 526,233.47 | 358,342 | 450,940 | 148,966 | 24.16 | 6,166 |
| 1979 | 144,962.66 | 96,400 | 121,310 | 43,947 | 25.00 | 1,758 |
| 1980 | 1,157,039.66 | 750,750 | 944,748 | 374,277 | 25.85 | 14,479 |
| 1981 | 65,447.70 | 41,396 | 52,093 | 22,517 | 26.71 | 843 |
| 1982 | 272,572.07 | 167,848 | 211,221 | 99,511 | 27.59 | 3,607 |
| 1983 | 564,279.89 | 338,043 | 425,395 | 217,884 | 28.47 | 7,653 |
| 1984 | 26,779.68 | 15,590 | 19,619 | 10,910 | 29.36 | 372 |
| 1985 | 914,217.74 | 516,414 | 649,858 | 392,350 | 30.27 | 12,962 |
| 1986 | 84,189.34 | 46,100 | 58,013 | 37,963 | 31.18 | 1,218 |
| 1987 | 152,983.16 | 81,096 | 102,052 | 72,349 | 32.10 | 2,254 |
| 1988 | 117,705.66 | 60,316 | 75,902 | 58,282 | 33.03 | 1,765 |
| 1989 | 406,872.20 | 201,304 | 253,322 | 210,512 | 33.96 | 6,199 |
| 1990 | 289,793.00 | 138,201 | 173,913 | 156,451 | 34.90 | 4,483 |
| 1991 | 469,171.72 | 215,279 | 270,908 | 263,948 | 35.85 | 7,363 |
| 1992 | 382,068.34 | 168,417 | 211,937 | 223,621 | 36.80 | 6,077 |
| 1993 | 54,650.56 | 23,093 | 29,060 | 33,242 | 37.76 | 880 |
| 1994 | 671,843.79 | 271,642 | 341,836 | 424,066 | 38.72 | 10,952 |
| 1995 | 227,348.10 | 87,731 | 110,401 | 148,776 | 39.69 | 3,748 |
| 1996 | 93,595.81 | 34,392 | 43,279 | 63,420 | 40.66 | 1,560 |
| 1997 | 20,857.26 | 7,276 | 9,156 | 14,621 | 41.64 | 351 |
| 1998 | 290,277.41 | 95,857 | 120,627 | 210,289 | 42.62 | 4,934 |
| 1999 | 87,492.36 | 27,262 | 34,307 | 65,434 | 43.60 | 1,501 |
| 2000 | 117,716.09 | 34,488 | 43,400 | 90,796 | 44.58 | 2,037 |
| 2001 | 115,541.04 | 31,678 | 39,864 | 91,853 | 45.57 | 2,016 |
| 2002 | 34,593.27 | 8,834 | 11,117 | 28,319 | 46.56 | 608 |
| 2003 | 91,821.83 | 21,720 | 27,333 | 77,344 | 47.55 | 1,627 |
| 2005 | 114,623.60 | 22,802 | 28,694 | 101,977 | 49.53 | 2,059 |
| 2006 | 42,472.94 | 7,650 | 9,627 | 38,792 | 50.52 | 768 |
| 2010 | 60,549.31 | 6,316 | 7,948 | 61,078 | 54.51 | 1,120 |
| 2011 | 299,364.07 | 25,538 | 32,137 | 309,138 | 55.51 | 5,569 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C04 - CABLES - ABOVE GROUND

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 60-R4 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 2012 | 851,025.79 | 56,590 | 71,213 | 898,956 | 56.50 | 15,911 |
| 2013 | 162,111.78 | 7,701 | 9,691 | 175,116 | 57.50 | 3,045 |
| 2015 | 101,754.69 | 1,021 | 1,285 | 114,715 | 56.00 | 2,048 |
| | 10,550,928.82 | 5,202,879 | 6,547,333 | 5,480,726 | | 148,856 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 36.8 1.41

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C06 - CAPACITORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 35-R3 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1966 | 44,470.98 | 42,704 | 28,601 | 17,204 | 2.37 | 7,259 |
| 1970 | 2,823.50 | 2,625 | 1,758 | 1,150 | 3.41 | 337 |
| 1971 | 260,900.32 | 240,473 | 161,054 | 107,673 | 3.68 | 29,259 |
| 1976 | 24,435.00 | 21,422 | 14,347 | 10,821 | 5.21 | 2,077 |
| 1980 | 73,112.99 | 60,611 | 40,594 | 34,712 | 6.83 | 5,082 |
| 1982 | 23,267.18 | 18,624 | 12,473 | 11,492 | 7.80 | 1,473 |
| 1987 | 83,725.72 | 59,923 | 40,133 | 46,104 | 10.68 | 4,317 |
| 1995 | 9,531.39 | 5,217 | 3,494 | 6,323 | 16.40 | 386 |
| 1996 | 315,830.49 | 165,441 | 110,802 | 214,503 | 17.20 | 12,471 |
| 2000 | 156,646.75 | 66,797 | 44,737 | 116,609 | 20.51 | 5,685 |
| | 994,744.32 | 683,837 | 457,993 | 566,594 | | 68,346 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 8.3 6.87

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C07 - CHEMICAL FEED SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 45-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1968 | 50,551.82 | 47,000 | 53,585 | | | |
| 1969 | 244,559.50 | 225,071 | 259,233 | | | |
| 1971 | 72,184.00 | 64,918 | 76,358 | 157 | 6.82 | 23 |
| 1979 | 50,551.82 | 39,653 | 46,641 | 6,944 | 11.70 | 594 |
| 1980 | 49,318.00 | 37,860 | 44,532 | 7,745 | 12.41 | 624 |
| 1997 | 28,676.00 | 12,314 | 14,484 | 15,913 | 26.77 | 594 |
| 2014 | 13,291.22 | 470 | 553 | 13,536 | 43.50 | 311 |
| | 509,132.36 | 427,286 | 495,386 | 44,295 | | 2,146 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 20.6 0.42

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C09 - CIRCUIT BREAKERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 60-R2.5 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1965 | 425,666.49 | 311,538 | 349,668 | 110,052 | 19.34 | 5,690 |
| 1966 | 367,145.54 | 264,806 | 297,217 | 99,300 | 19.93 | 4,982 |
| 1967 | 1,042,097.33 | 740,185 | 830,779 | 294,686 | 20.54 | 14,347 |
| 1968 | 796,597.78 | 556,915 | 625,078 | 235,248 | 21.16 | 11,118 |
| 1969 | 111,883.17 | 76,951 | 86,369 | 34,465 | 21.79 | 1,582 |
| 1970 | 1,667,950.56 | 1,127,668 | 1,265,687 | 535,700 | 22.44 | 23,873 |
| 1971 | 447,005.29 | 296,983 | 333,332 | 149,434 | 23.09 | 6,472 |
| 1972 | 570,106.07 | 371,892 | 417,409 | 198,306 | 23.76 | 8,346 |
| 1974 | 143,276.68 | 89,981 | 100,994 | 53,745 | 25.11 | 2,140 |
| 1975 | 284,265.78 | 174,942 | 196,354 | 110,653 | 25.81 | 4,287 |
| 1976 | 46,322.66 | 27,924 | 31,342 | 18,686 | 26.51 | 705 |
| 1977 | 591,124.91 | 348,683 | 391,360 | 247,055 | 27.23 | 9,073 |
| 1978 | 368,036.29 | 212,321 | 238,308 | 159,171 | 27.95 | 5,695 |
| 1979 | 77,376.00 | 43,621 | 48,960 | 34,606 | 28.68 | 1,207 |
| 1980 | 752,547.60 | 414,235 | 464,935 | 347,816 | 29.42 | 11,822 |
| 1981 | 201,796.88 | 108,354 | 121,616 | 96,325 | 30.17 | 3,193 |
| 1982 | 1,010,144.64 | 528,754 | 593,470 | 497,486 | 30.92 | 16,089 |
| 1983 | 312,136.55 | 159,057 | 178,524 | 158,583 | 31.69 | 5,004 |
| 1985 | 39,560.00 | 19,055 | 21,387 | 21,338 | 33.24 | 642 |
| 1986 | 37,090.93 | 17,338 | 19,460 | 20,598 | 34.03 | 605 |
| 1987 | 74,384.82 | 33,714 | 37,840 | 42,496 | 34.82 | 1,220 |
| 1988 | 144,831.66 | 63,532 | 71,308 | 85,110 | 35.63 | 2,389 |
| 1989 | 584,900.94 | 248,047 | 278,406 | 353,287 | 36.44 | 9,695 |
| 1990 | 377,794.87 | 154,708 | 173,643 | 234,375 | 37.25 | 6,292 |
| 1991 | 105,091.04 | 41,464 | 46,539 | 66,959 | 38.08 | 1,758 |
| 1992 | 1,090,316.93 | 413,906 | 464,566 | 712,976 | 38.91 | 18,324 |
| 1993 | 272,449.19 | 99,358 | 111,519 | 182,726 | 39.74 | 4,598 |
| 1994 | 25,447.73 | 8,891 | 9,979 | 17,505 | 40.59 | 431 |
| 1995 | 829,497.24 | 277,115 | 311,032 | 584,825 | 41.44 | 14,113 |
| 1996 | 429,268.08 | 136,765 | 153,504 | 310,106 | 42.30 | 7,331 |
| 1997 | 193,557.82 | 58,672 | 65,853 | 143,189 | 43.16 | 3,318 |
| 1998 | 154,366.88 | 44,375 | 49,806 | 116,910 | 44.03 | 2,655 |
| 2000 | 264,854.19 | 67,792 | 76,089 | 209,954 | 45.78 | 4,586 |
| 2001 | 18,558.77 | 4,453 | 4,998 | 15,045 | 46.67 | 322 |
| 2002 | 421,478.53 | 94,376 | 105,927 | 349,270 | 47.56 | 7,344 |
| 2003 | 349,437.85 | 72,648 | 81,540 | 295,853 | 48.45 | 6,106 |
| 2004 | 80,483.15 | 15,429 | 17,317 | 69,605 | 49.35 | 1,410 |
| 2005 | 50,011.92 | 8,768 | 9,841 | 44,172 | 50.26 | 879 |
| 2006 | 186,607.14 | 29,660 | 33,290 | 168,246 | 51.17 | 3,288 |
| 2007 | 289,169.14 | 41,224 | 46,270 | 266,033 | 52.08 | 5,108 |
| 2008 | 295,465.76 | 37,230 | 41,787 | 277,316 | 53.00 | 5,232 |
| 2009 | 608,353.56 | 66,576 | 74,725 | 582,297 | 53.92 | 10,799 |
| 2010 | 473,265.53 | 43,870 | 49,239 | 461,888 | 54.85 | 8,421 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C09 - CIRCUIT BREAKERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 60-R2.5 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 2011 | 952,197.82 | 72,500 | 81,374 | 947,000 | 55.77 | 16,980 |
| 2012 | 3,317,849.11 | 196,471 | 220,518 | 3,362,759 | 56.71 | 59,297 |
| 2013 | 3,601,188.71 | 152,966 | 171,688 | 3,717,596 | 57.64 | 64,497 |
| 2014 | 1,864,738.64 | 47,669 | 53,503 | 1,960,415 | 58.58 | 33,466 |
| 2015 | 13,308,974.30 | 162,423 | 182,303 | 14,191,390 | 43.75 | 324,375 |
| | 39,656,672.47 | 8,585,805 | 9,636,653 | 33,192,554 | | 761,106 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 43.6 1.92

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C10 - COMPRESSED AIR SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 41-R1.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1966 | 36,402.01 | 27,843 | 36,402 | | | |
| 1967 | 134,088.28 | 101,351 | 134,088 | | | |
| 1968 | 20,339.00 | 15,185 | 20,339 | | | |
| 1969 | 41,026.75 | 30,230 | 41,027 | | | |
| 1970 | 6,003.88 | 4,364 | 6,004 | | | |
| 1971 | 115,324.40 | 82,668 | 115,324 | | | |
| 1974 | 96,150.08 | 65,781 | 95,714 | 436 | 12.95 | 34 |
| 1975 | 10,000.00 | 6,727 | 9,788 | 212 | 13.42 | 16 |
| 1976 | 41,950.85 | 27,729 | 40,347 | 1,604 | 13.90 | 115 |
| 1977 | 138,474.81 | 89,873 | 130,768 | 7,707 | 14.39 | 536 |
| 1978 | 62,390.47 | 39,717 | 57,790 | 4,600 | 14.90 | 309 |
| 1979 | 42,011.01 | 26,211 | 38,138 | 3,873 | 15.42 | 251 |
| 1980 | 227,569.20 | 138,983 | 202,225 | 25,344 | 15.96 | 1,588 |
| 1982 | 153,558.59 | 89,663 | 130,463 | 23,096 | 17.06 | 1,354 |
| 1983 | 56,543.78 | 32,230 | 46,896 | 9,648 | 17.63 | 547 |
| 1984 | 166,456.15 | 92,525 | 134,627 | 31,829 | 18.21 | 1,748 |
| 1987 | 36,205.07 | 18,526 | 26,956 | 9,249 | 20.02 | 462 |
| 1988 | 114,736.03 | 56,948 | 82,861 | 31,875 | 20.65 | 1,544 |
| 1989 | 75,207.79 | 36,155 | 52,607 | 22,601 | 21.29 | 1,062 |
| 1990 | 41,543.60 | 19,323 | 28,116 | 13,428 | 21.93 | 612 |
| 1991 | 35,627.98 | 15,998 | 23,278 | 12,350 | 22.59 | 547 |
| 1992 | 515,633.45 | 223,104 | 324,623 | 191,010 | 23.26 | 8,212 |
| 1993 | 44,089.54 | 18,356 | 26,709 | 17,381 | 23.93 | 726 |
| 1994 | 234,644.19 | 93,743 | 136,399 | 98,245 | 24.62 | 3,990 |
| 1995 | 129,037.60 | 49,380 | 71,849 | 57,189 | 25.31 | 2,260 |
| 1996 | 10,656.00 | 3,896 | 5,669 | 4,987 | 26.01 | 192 |
| 1997 | 28,531.93 | 9,937 | 14,459 | 14,073 | 26.72 | 527 |
| 1998 | 83,020.75 | 27,457 | 39,951 | 43,070 | 27.44 | 1,570 |
| 1999 | 164,358.52 | 51,472 | 74,893 | 89,466 | 28.16 | 3,177 |
| 2000 | 194,860.89 | 57,556 | 83,746 | 111,115 | 28.89 | 3,846 |
| 2001 | 147,959.05 | 41,032 | 59,703 | 88,256 | 29.63 | 2,979 |
| 2002 | 41,272.02 | 10,690 | 15,554 | 25,718 | 30.38 | 847 |
| 2003 | 199,999.97 | 48,146 | 70,054 | 129,946 | 31.13 | 4,174 |
| 2006 | 30,617.63 | 5,668 | 8,247 | 22,371 | 33.41 | 670 |
| 2007 | 245,404.91 | 40,762 | 59,310 | 186,095 | 34.19 | 5,443 |
| 2008 | 437,893.16 | 64,401 | 93,705 | 344,188 | 34.97 | 9,842 |
| 2009 | 168,689.23 | 21,601 | 31,430 | 137,259 | 35.75 | 3,839 |
| 2010 | 140,437.37 | 15,243 | 22,179 | 118,258 | 36.55 | 3,236 |
| 2011 | 594,575.25 | 53,078 | 77,230 | 517,345 | 37.34 | 13,855 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C10 - COMPRESSED AIR SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 41-R1.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2013 | 1,517,053.33 | 75,853 | 110,368 | 1,406,685 | 38.95 | 36,115 |
| 2014 | 1,947,748.40 | 58,432 | 85,020 | 1,862,728 | 39.77 | 46,838 |
| 2015 | 8,138,617.43 | 172,539 | 251,050 | 7,887,568 | 23.03 | 342,491 |
| | 16,666,710.35 | 2,160,376 | 3,115,906 | 13,550,805 | | 505,554 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 26.8 | 3.03 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C11 - COMPUTERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 5-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2011 | 833,717.71 | 750,346 | 833,718 | | | |
| 2012 | 486,015.94 | 340,211 | 474,522 | 11,494 | 1.50 | 7,663 |
| 2013 | 507,503.04 | 253,752 | 353,930 | 153,573 | 2.50 | 61,429 |
| 2014 | 906,905.69 | 272,072 | 379,483 | 527,423 | 3.50 | 150,692 |
| 2015 | 2,165,632.80 | 216,563 | 302,060 | 1,863,573 | 4.50 | 414,127 |
| | 4,899,775.18 | 1,832,944 | 2,343,713 | 2,556,063 | | 633,911 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 4.0 12.94

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C12 - CONDENSERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R3 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1968 | 125,930.00 | 94,097 | 125,930 | 3,778 | 15.10 | 250 |
| | 125,930.00 | 94,097 | 125,930 | 3,778 | | 250 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 15.1 0.20

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C13 - CONDUCTOR - TRANSMISSION

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 60-R3 | | | | | | |
| NET SALVAGE PERCENT.. -20 | | | | | | |
| 1967 | 4,914,310.79 | 4,075,949 | 3,201,552 | 2,695,621 | 18.53 | 145,473 |
| 1968 | 2,408,871.94 | 1,966,593 | 1,544,708 | 1,345,938 | 19.18 | 70,174 |
| 1969 | 252,646.14 | 202,924 | 159,392 | 143,783 | 19.84 | 7,247 |
| 1970 | 773,190.55 | 610,669 | 479,665 | 448,164 | 20.51 | 21,851 |
| 1974 | 1,719,831.21 | 1,261,661 | 991,002 | 1,072,795 | 23.32 | 46,003 |
| 1976 | 115,943.00 | 81,647 | 64,132 | 75,000 | 24.79 | 3,025 |
| 1977 | 3,045,179.01 | 2,099,346 | 1,648,982 | 2,005,233 | 25.53 | 78,544 |
| 1978 | 4,925,086.90 | 3,320,474 | 2,608,146 | 3,301,958 | 26.29 | 125,597 |
| 1980 | 181,069.54 | 116,464 | 91,479 | 125,804 | 27.84 | 4,519 |
| 1981 | 4,162,701.19 | 2,611,662 | 2,051,393 | 2,943,848 | 28.63 | 102,824 |
| 1982 | 3,398,474.63 | 2,078,521 | 1,632,624 | 2,445,546 | 29.42 | 83,125 |
| 1983 | 5,998,197.19 | 3,571,351 | 2,805,204 | 4,392,633 | 30.23 | 145,307 |
| 1984 | 47,247.22 | 27,366 | 21,495 | 35,202 | 31.04 | 1,134 |
| 1985 | 5,404,348.91 | 3,041,568 | 2,389,073 | 4,096,146 | 31.86 | 128,567 |
| 1987 | 2,718,221.55 | 1,439,037 | 1,130,326 | 2,131,540 | 33.53 | 63,571 |
| 1988 | 1,473,940.83 | 755,247 | 593,227 | 1,175,502 | 34.38 | 34,191 |
| 1990 | 10,521,540.36 | 5,031,401 | 3,952,035 | 8,673,813 | 36.09 | 240,338 |
| 1991 | 86,132.87 | 39,690 | 31,175 | 72,184 | 36.96 | 1,953 |
| 1993 | 41,589.61 | 17,701 | 13,904 | 36,004 | 38.72 | 930 |
| 1994 | 60,822.38 | 24,803 | 19,482 | 53,505 | 39.61 | 1,351 |
| 1995 | 1,422,398.39 | 554,445 | 435,502 | 1,271,376 | 40.51 | 31,384 |
| 1996 | 1,224,020.27 | 455,086 | 357,458 | 1,111,366 | 41.41 | 26,838 |
| 1997 | 1,145,752.44 | 405,143 | 318,229 | 1,056,674 | 42.32 | 24,969 |
| 1998 | 1,573,598.67 | 527,464 | 414,309 | 1,474,009 | 43.24 | 34,089 |
| 1999 | 21,688.99 | 6,871 | 5,397 | 20,630 | 44.16 | 467 |
| 2000 | 3,007,366.22 | 897,410 | 704,893 | 2,903,946 | 45.08 | 64,418 |
| 2001 | 2,311,965.35 | 646,426 | 507,751 | 2,266,607 | 46.02 | 49,253 |
| 2002 | 2,594,819.36 | 676,719 | 531,545 | 2,582,238 | 46.96 | 54,988 |
| 2003 | 221,106.87 | 53,509 | 42,030 | 223,298 | 47.90 | 4,662 |
| 2004 | 434,397.16 | 96,869 | 76,088 | 445,189 | 48.85 | 9,113 |
| 2006 | 705,521.48 | 130,524 | 102,523 | 744,103 | 50.75 | 14,662 |
| 2009 | 111,767.05 | 14,217 | 11,167 | 122,953 | 53.64 | 2,292 |
| 2012 | 299,025.72 | 20,572 | 16,159 | 342,672 | 56.56 | 6,059 |
| | 67,322,773.79 | 36,859,329 | 28,952,047 | 51,835,281 | | 1,628,918 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 31.8 2.42

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C14 - CONDUCTOR - DISTRIBUTION

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 45-R3 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1971 | 3,753.07 | 3,392 | 4,073 | 205 | 9.32 | 22 |
| 1977 | 656.03 | 539 | 647 | 101 | 12.57 | 8 |
| 1980 | 680,075.68 | 526,164 | 631,829 | 143,457 | 14.46 | 9,921 |
| 1981 | 3,794,248.37 | 2,871,143 | 3,447,731 | 877,712 | 15.13 | 58,011 |
| 1982 | 324,313.18 | 239,824 | 287,986 | 81,731 | 15.81 | 5,170 |
| 1983 | 365,982.33 | 264,146 | 317,192 | 100,028 | 16.51 | 6,059 |
| 1984 | 869,595.49 | 611,983 | 734,883 | 256,456 | 17.22 | 14,893 |
| 1985 | 1,131,140.14 | 775,415 | 931,135 | 358,365 | 17.94 | 19,976 |
| 1986 | 665,165.55 | 443,515 | 532,583 | 225,706 | 18.68 | 12,083 |
| 1987 | 929,287.13 | 601,732 | 722,573 | 336,814 | 19.44 | 17,326 |
| 1988 | 912,838.30 | 573,505 | 688,677 | 351,959 | 20.20 | 17,424 |
| 1989 | 1,267,583.55 | 771,336 | 926,237 | 518,808 | 20.98 | 24,729 |
| 1990 | 810,770.90 | 477,131 | 572,949 | 351,330 | 21.77 | 16,138 |
| 1991 | 674,376.06 | 383,195 | 460,149 | 308,640 | 22.57 | 13,675 |
| 1992 | 209,024.16 | 114,483 | 137,474 | 100,814 | 23.38 | 4,312 |
| 1993 | 718,909.28 | 378,635 | 454,673 | 364,884 | 24.21 | 15,072 |
| 1994 | 531,275.33 | 268,644 | 322,594 | 283,060 | 25.04 | 11,304 |
| 1995 | 767,449.08 | 371,540 | 446,153 | 428,739 | 25.89 | 16,560 |
| 1996 | 736,198.70 | 340,558 | 408,950 | 430,317 | 26.74 | 16,093 |
| 1997 | 1,387,592.71 | 611,292 | 734,053 | 847,803 | 27.61 | 30,706 |
| 1998 | 529,319.58 | 221,390 | 265,850 | 337,574 | 28.49 | 11,849 |
| 1999 | 506,039.28 | 200,369 | 240,607 | 336,278 | 29.37 | 11,450 |
| 2000 | 690,169.14 | 257,541 | 309,261 | 477,532 | 30.27 | 15,776 |
| 2001 | 579,576.91 | 203,058 | 243,836 | 416,882 | 31.17 | 13,374 |
| 2002 | 3,846,551.26 | 1,258,997 | 1,511,831 | 2,873,237 | 32.08 | 89,565 |
| 2003 | 456,361.12 | 138,736 | 166,597 | 353,655 | 33.00 | 10,717 |
| 2004 | 302,078.96 | 84,715 | 101,728 | 242,642 | 33.93 | 7,151 |
| 2005 | 211,959.87 | 54,447 | 65,381 | 176,253 | 34.86 | 5,056 |
| 2006 | 836,237.51 | 194,685 | 233,782 | 719,529 | 35.81 | 20,093 |
| 2007 | 503,436.12 | 105,216 | 126,346 | 447,571 | 36.75 | 12,179 |
| 2008 | 513,342.62 | 94,804 | 113,843 | 471,368 | 37.71 | 12,500 |
| 2009 | 700,782.34 | 112,380 | 134,948 | 663,944 | 38.67 | 17,169 |
| 2010 | 257,354.34 | 35,010 | 42,041 | 251,343 | 39.63 | 6,342 |
| 2011 | 679,683.14 | 75,764 | 90,979 | 683,860 | 40.60 | 16,844 |
| 2012 | 1,516,047.71 | 131,731 | 158,186 | 1,570,108 | 41.57 | 37,770 |
| 2013 | 2,528,214.39 | 156,905 | 188,415 | 2,693,749 | 42.55 | 63,308 |
| 2014 | 1,708,712.98 | 63,639 | 76,419 | 1,871,514 | 43.53 | 42,994 |
| 2015 | 1,173,947.41 | 17,532 | 21,052 | 1,317,248 | 37.67 | 34,968 |
| | 34,320,049.72 | 14,035,091 | 16,853,643 | 22,271,213 | | 738,587 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 30.2 2.15

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C15 - CONTROL, METER, RELAYING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 40-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1966 | 36,520.98 | 32,339 | 36,521 | | | |
| 1967 | 2,199,495.92 | 1,931,707 | 2,199,496 | | | |
| 1968 | 187,202.31 | 162,960 | 187,202 | | | |
| 1969 | 15,677.96 | 13,522 | 15,678 | | | |
| 1970 | 533,801.11 | 456,000 | 533,801 | | | |
| 1974 | 120,963.38 | 98,615 | 115,780 | 5,183 | 7.39 | 701 |
| 1975 | 601,106.89 | 483,290 | 567,412 | 33,695 | 7.84 | 4,298 |
| 1976 | 15,568.70 | 12,334 | 14,481 | 1,088 | 8.31 | 131 |
| 1977 | 246,762.49 | 192,475 | 225,978 | 20,784 | 8.80 | 2,362 |
| 1978 | 373,655.09 | 286,593 | 336,478 | 37,177 | 9.32 | 3,989 |
| 1979 | 375,981.62 | 283,302 | 332,614 | 43,368 | 9.86 | 4,398 |
| 1980 | 455,216.20 | 336,632 | 395,227 | 59,989 | 10.42 | 5,757 |
| 1981 | 170,456.85 | 123,539 | 145,042 | 25,415 | 11.01 | 2,308 |
| 1982 | 658,589.68 | 467,269 | 548,603 | 109,987 | 11.62 | 9,465 |
| 1983 | 388,062.45 | 269,218 | 316,078 | 71,984 | 12.25 | 5,876 |
| 1984 | 100,532.36 | 68,136 | 79,996 | 20,536 | 12.89 | 1,593 |
| 1985 | 252,442.18 | 166,864 | 195,909 | 56,533 | 13.56 | 4,169 |
| 1986 | 359,520.68 | 231,441 | 271,726 | 87,795 | 14.25 | 6,161 |
| 1987 | 368,451.36 | 230,743 | 270,906 | 97,545 | 14.95 | 6,525 |
| 1988 | 280,161.31 | 170,408 | 200,069 | 80,092 | 15.67 | 5,111 |
| 1989 | 472,543.72 | 278,801 | 327,330 | 145,214 | 16.40 | 8,855 |
| 1990 | 855,124.00 | 488,490 | 573,517 | 281,607 | 17.15 | 16,420 |
| 1991 | 317,765.84 | 175,486 | 206,031 | 111,735 | 17.91 | 6,239 |
| 1992 | 1,264,624.68 | 673,729 | 790,999 | 473,626 | 18.69 | 25,341 |
| 1993 | 186,436.87 | 95,642 | 112,290 | 74,147 | 19.48 | 3,806 |
| 1994 | 598,119.58 | 294,723 | 346,023 | 252,097 | 20.29 | 12,425 |
| 1995 | 1,065,976.45 | 503,674 | 591,344 | 474,632 | 21.10 | 22,494 |
| 1996 | 404,758.31 | 182,850 | 214,677 | 190,081 | 21.93 | 8,668 |
| 1997 | 565,586.88 | 243,485 | 285,866 | 279,721 | 22.78 | 12,279 |
| 1998 | 730,947.18 | 299,140 | 351,209 | 379,738 | 23.63 | 16,070 |
| 1999 | 530,389.44 | 205,659 | 241,456 | 288,933 | 24.49 | 11,798 |
| 2000 | 822,908.39 | 300,979 | 353,368 | 469,540 | 25.37 | 18,508 |
| 2001 | 950,459.04 | 326,483 | 383,311 | 567,148 | 26.26 | 21,597 |
| 2002 | 239,056.24 | 76,797 | 90,165 | 148,891 | 27.15 | 5,484 |
| 2003 | 446,753.60 | 133,356 | 156,568 | 290,186 | 28.06 | 10,342 |
| 2004 | 445,632.59 | 122,772 | 144,142 | 301,491 | 28.98 | 10,403 |
| 2005 | 427,141.09 | 107,853 | 126,626 | 300,515 | 29.90 | 10,051 |
| 2006 | 409,537.22 | 93,886 | 110,228 | 299,309 | 30.83 | 9,708 |
| 2007 | 82,358.78 | 16,945 | 19,895 | 62,464 | 31.77 | 1,966 |
| 2008 | 223,078.36 | 40,600 | 47,667 | 175,411 | 32.72 | 5,361 |
| 2009 | 894,285.65 | 141,297 | 165,891 | 728,395 | 33.68 | 21,627 |
| 2010 | 539,700.35 | 72,320 | 84,908 | 454,792 | 34.64 | 13,129 |
| 2011 | 412,886.73 | 45,418 | 53,324 | 359,563 | 35.60 | 10,100 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C15 - CONTROL, METER, RELAYING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 40-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2012 | 1,129,269.89 | 96,835 | 113,690 | 1,015,580 | 36.57 | 27,771 |
| 2013 | 601,208.05 | 36,824 | 43,234 | 557,974 | 37.55 | 14,859 |
| 2014 | 700,071.44 | 25,728 | 30,206 | 669,865 | 38.53 | 17,386 |
| 2015 | 6,588,417.68 | 97,509 | 114,482 | 6,473,936 | 33.40 | 193,830 |
| | 29,645,207.57 | 11,194,668 | 13,067,444 | 16,577,763 | | 599,361 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 27.7 | 2.02 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C16 - COOLING SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 40-R1.5 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1965 | 49,714.69 | 40,171 | 51,206 | | | |
| 1966 | 135,606.99 | 108,353 | 139,675 | | | |
| 1968 | 3,234.56 | 2,524 | 3,332 | | | |
| 1969 | 49,140.60 | 37,860 | 50,615 | | | |
| 1971 | 36,015.66 | 27,006 | 37,096 | | | |
| 1973 | 19,339.13 | 14,078 | 19,919 | | | |
| 1977 | 283,921.00 | 193,156 | 292,439 | | | |
| 1979 | 137,803.24 | 90,201 | 139,351 | 2,586 | 14.58 | 177 |
| 1980 | 26,475.28 | 16,975 | 26,225 | 1,045 | 15.10 | 69 |
| 1981 | 25,088.47 | 15,737 | 24,312 | 1,529 | 15.64 | 98 |
| 1982 | 166,753.32 | 102,238 | 157,947 | 13,809 | 16.19 | 853 |
| 1983 | 8,937.20 | 5,351 | 8,267 | 938 | 16.75 | 56 |
| 1984 | 249,308.82 | 145,599 | 224,935 | 31,853 | 17.32 | 1,839 |
| 1988 | 32,571.66 | 17,009 | 26,277 | 7,272 | 19.72 | 369 |
| 1989 | 129,470.58 | 65,510 | 101,206 | 32,149 | 20.35 | 1,580 |
| 1992 | 37,915.23 | 17,271 | 26,682 | 12,371 | 22.31 | 555 |
| 1993 | 9,304.03 | 4,078 | 6,300 | 3,283 | 22.98 | 143 |
| 1994 | 352,789.80 | 148,438 | 229,321 | 134,052 | 23.66 | 5,666 |
| 1995 | 161,864.75 | 65,229 | 100,772 | 65,949 | 24.35 | 2,708 |
| 1998 | 313,562.88 | 109,325 | 168,895 | 154,075 | 26.46 | 5,823 |
| 1999 | 106,668.44 | 35,213 | 54,400 | 55,468 | 27.18 | 2,041 |
| 2000 | 152,434.02 | 47,455 | 73,313 | 83,694 | 27.91 | 2,999 |
| 2002 | 39,354.90 | 10,752 | 16,611 | 23,925 | 29.39 | 814 |
| 2003 | 86,319.27 | 21,916 | 33,858 | 55,051 | 30.14 | 1,827 |
| 2005 | 28,881.00 | 6,210 | 9,594 | 20,153 | 31.65 | 637 |
| 2006 | 135,121.63 | 26,374 | 40,745 | 98,430 | 32.42 | 3,036 |
| 2007 | 79,243.07 | 13,896 | 21,468 | 60,152 | 33.19 | 1,812 |
| 2008 | 340,925.64 | 52,936 | 81,780 | 269,373 | 33.97 | 7,930 |
| 2009 | 480,251.41 | 64,800 | 100,109 | 394,550 | 34.76 | 11,351 |
| 2010 | 348,761.61 | 39,964 | 61,740 | 297,484 | 35.55 | 8,368 |
| 2011 | 446,006.93 | 42,034 | 64,938 | 394,449 | 36.34 | 10,854 |
| 2012 | 16,052.49 | 1,178 | 1,820 | 14,714 | 37.15 | 396 |
| 2013 | 1,708,834.64 | 90,205 | 139,357 | 1,620,743 | 37.95 | 42,707 |
| 2014 | 557,250.79 | 17,650 | 27,268 | 546,700 | 38.77 | 14,101 |
| 2015 | 3,252,113.98 | 73,023 | 112,813 | 3,236,865 | 22.49 | 143,925 |
| | 10,007,037.71 | 1,769,715 | 2,674,586 | 7,632,663 | | 272,734 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 28.0 2.73

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C17 - COUNTERPOISE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R2.5 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1967 | 431,098.26 | 320,208 | 314,987 | 141,977 | 16.46 | 8,626 |
| 1968 | 247,792.88 | 181,380 | 178,423 | 84,237 | 17.02 | 4,949 |
| 1970 | 546.00 | 387 | 381 | 198 | 18.20 | 11 |
| 1974 | 15,552.35 | 10,281 | 10,113 | 6,372 | 20.70 | 308 |
| 1978 | 123,318.62 | 75,104 | 73,879 | 56,839 | 23.40 | 2,429 |
| 1981 | 9,506.07 | 5,399 | 5,311 | 4,765 | 25.53 | 187 |
| 1982 | 27,542.40 | 15,256 | 15,007 | 14,188 | 26.26 | 540 |
| 1983 | 15,526.13 | 8,378 | 8,241 | 8,217 | 27.00 | 304 |
| 1985 | 214,651.00 | 109,629 | 107,842 | 119,688 | 28.50 | 4,200 |
| 1986 | 106,804.26 | 52,963 | 52,100 | 61,113 | 29.27 | 2,088 |
| 1987 | 11,117.41 | 5,346 | 5,259 | 6,525 | 30.05 | 217 |
| 1988 | 215,117.18 | 100,205 | 98,571 | 129,453 | 30.83 | 4,199 |
| 1989 | 147,661.97 | 66,536 | 65,451 | 91,071 | 31.62 | 2,880 |
| 1990 | 34,172.01 | 14,871 | 14,629 | 21,593 | 32.42 | 666 |
| 1991 | 558.98 | 235 | 231 | 362 | 33.23 | 11 |
| 1992 | 161,824.60 | 65,339 | 64,274 | 107,260 | 34.05 | 3,150 |
| 1993 | 365,268.31 | 141,709 | 139,398 | 247,786 | 34.87 | 7,106 |
| 1994 | 331,398.89 | 123,269 | 121,259 | 230,024 | 35.70 | 6,443 |
| 1995 | 19,011.26 | 6,764 | 6,654 | 13,498 | 36.54 | 369 |
| 1996 | 17,886.51 | 6,074 | 5,975 | 12,985 | 37.38 | 347 |
| 1997 | 48,442.27 | 15,657 | 15,402 | 35,947 | 38.23 | 940 |
| 1999 | 3,158.47 | 916 | 901 | 2,447 | 39.96 | 61 |
| 2000 | 280,787.97 | 76,683 | 75,433 | 222,202 | 40.83 | 5,442 |
| 2001 | 216,852.36 | 55,544 | 54,638 | 175,226 | 41.71 | 4,201 |
| 2002 | 181,203.61 | 43,340 | 42,633 | 149,443 | 42.59 | 3,509 |
| 2003 | 352,909.92 | 78,352 | 77,075 | 297,010 | 43.48 | 6,831 |
| 2012 | 43,379.13 | 2,751 | 2,706 | 43,276 | 51.71 | 837 |
| | 3,623,088.82 | 1,582,576 | 1,556,773 | 2,283,701 | | 70,851 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 32.2 1.96

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C18 - CRANES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 70-R3 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1966 | 658,978.00 | 422,473 | 206,343 | 472,404 | 26.43 | 17,874 |
| 1967 | 189,000.00 | 119,194 | 58,216 | 136,454 | 27.14 | 5,028 |
| 1969 | 234,007.00 | 142,517 | 69,608 | 171,419 | 28.61 | 5,992 |
| 1979 | 597,576.53 | 295,263 | 144,211 | 471,293 | 36.42 | 12,940 |
| 1980 | 136,287.00 | 65,696 | 32,087 | 108,289 | 37.24 | 2,908 |
| 1982 | 1,501,411.45 | 686,842 | 335,465 | 1,210,989 | 38.91 | 31,123 |
| 1984 | 993,957.00 | 429,986 | 210,012 | 813,764 | 40.60 | 20,043 |
| 1985 | 123,618.00 | 51,912 | 25,355 | 101,972 | 41.46 | 2,460 |
| 1988 | 304,605.66 | 116,220 | 56,764 | 256,980 | 44.07 | 5,831 |
| 1989 | 23,800.39 | 8,773 | 4,285 | 20,229 | 44.95 | 450 |
| 1993 | 15,442.12 | 4,876 | 2,382 | 13,523 | 48.54 | 279 |
| 1995 | 3,781.63 | 1,093 | 534 | 3,361 | 50.36 | 67 |
| 1996 | 6,207.08 | 1,709 | 835 | 5,558 | 51.29 | 108 |
| 2002 | 8,414.90 | 1,621 | 792 | 7,875 | 56.91 | 138 |
| 2003 | 1,560,150.29 | 278,694 | 136,117 | 1,470,838 | 57.86 | 25,421 |
| 2006 | 93,901.29 | 12,808 | 6,256 | 90,462 | 60.73 | 1,490 |
| 2008 | 15,189.34 | 1,638 | 800 | 14,845 | 62.67 | 237 |
| 2011 | 143,366.54 | 9,303 | 4,544 | 143,124 | 65.59 | 2,182 |
| 2013 | 215,839.27 | 7,812 | 3,815 | 218,499 | 67.54 | 3,235 |
| 2014 | 63,166.18 | 1,375 | 672 | 64,389 | 68.52 | 940 |
| 2015 | 13,442.50 | 118 | 57 | 13,788 | 58.32 | 236 |
| | 6,902,142.17 | 2,659,923 | 1,299,150 | 5,810,056 | | 138,982 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 41.8 2.01

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT D01 - DAMS, DYKES, CANALS AND TUNNELS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 110-R4 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1956 | 615,305.93 | 348,759 | 103,011 | 561,519 | 52.27 | 10,743 |
| 1966 | 42,867,104.87 | 20,454,708 | 6,041,606 | 40,254,867 | 61.40 | 655,617 |
| 1967 | 27,131,965.00 | 12,695,904 | 3,749,926 | 25,552,596 | 62.34 | 409,891 |
| 1969 | 146,223.72 | 65,724 | 19,413 | 138,509 | 64.22 | 2,157 |
| 1970 | 4,899,824.94 | 2,156,678 | 637,007 | 4,654,804 | 65.17 | 71,426 |
| 1978 | 3,644,386.00 | 1,329,284 | 392,624 | 3,543,313 | 72.85 | 48,638 |
| 1979 | 26,954,544.28 | 9,574,869 | 2,828,082 | 26,282,826 | 73.82 | 356,039 |
| 1980 | 8,733,611.13 | 3,019,185 | 891,762 | 8,540,538 | 74.79 | 114,194 |
| 1982 | 54,770,206.67 | 17,885,145 | 5,282,647 | 53,869,176 | 76.74 | 701,970 |
| 1983 | 21,684,267.05 | 6,872,308 | 2,029,839 | 21,389,169 | 77.72 | 275,208 |
| 1984 | 113,124,637.53 | 34,764,785 | 10,268,302 | 111,906,307 | 78.70 | 1,421,935 |
| 1985 | 10,995,558.61 | 3,273,281 | 966,813 | 10,908,390 | 79.68 | 136,902 |
| 1986 | 48,803.37 | 14,054 | 4,151 | 48,557 | 80.67 | 602 |
| 1988 | 12,002,331.79 | 3,224,167 | 952,306 | 12,010,212 | 82.64 | 145,332 |
| 1989 | 503,088.54 | 130,303 | 38,487 | 504,849 | 83.62 | 6,037 |
| 1992 | 38,009.96 | 8,736 | 2,580 | 38,471 | 86.59 | 444 |
| 1993 | 4,711.97 | 1,037 | 306 | 4,783 | 87.58 | 55 |
| 2003 | 28,219,035.47 | 3,457,566 | 1,021,245 | 29,455,313 | 97.52 | 302,044 |
| 2005 | 2,863,283.51 | 294,608 | 87,017 | 3,005,329 | 99.52 | 30,198 |
| 2009 | 704,177.11 | 44,870 | 13,253 | 747,258 | 103.51 | 7,219 |
| 2010 | 496,885.77 | 26,784 | 7,911 | 528,726 | 104.51 | 5,059 |
| 2012 | 1,302,985.46 | 44,778 | 13,226 | 1,393,998 | 106.50 | 13,089 |
| 2014 | 158,306.95 | 2,332 | 689 | 170,283 | 108.50 | 1,569 |
| | 361,909,255.63 | 119,689,865 | 35,352,203 | 355,509,793 | | 4,716,368 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 75.4 1.30

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT D02 - DIESEL SYSTEMS AND ENGINES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 25-L0.5 | | | | | | |
| NET SALVAGE PERCENT.. -11 | | | | | | |
| 1965 | 644,462.40 | 507,901 | 715,353 | | | |
| 1968 | 10,325.00 | 7,908 | 11,461 | | | |
| 1973 | 394,804.06 | 285,903 | 438,233 | | | |
| 1980 | 1,137,849.89 | 746,694 | 1,202,375 | 60,638 | 10.22 | 5,933 |
| 1981 | 453,076.02 | 292,495 | 470,994 | 31,920 | 10.46 | 3,052 |
| 1982 | 933,452.28 | 592,668 | 954,353 | 81,779 | 10.70 | 7,643 |
| 1983 | 1,238,000.00 | 772,289 | 1,243,590 | 130,590 | 10.95 | 11,926 |
| 1984 | 337,094.61 | 206,395 | 332,351 | 41,824 | 11.21 | 3,731 |
| 1986 | 154,494.96 | 90,958 | 146,466 | 25,023 | 11.74 | 2,131 |
| 1987 | 41,924.03 | 24,180 | 38,936 | 7,600 | 12.01 | 633 |
| 1988 | 83,806.15 | 47,294 | 76,156 | 16,869 | 12.29 | 1,373 |
| 1989 | 64,057.60 | 35,324 | 56,881 | 14,223 | 12.58 | 1,131 |
| 1990 | 472,403.24 | 254,423 | 409,688 | 114,680 | 12.87 | 8,911 |
| 1991 | 383,928.98 | 201,659 | 324,724 | 101,437 | 13.17 | 7,702 |
| 1992 | 28,368.16 | 14,510 | 23,365 | 8,124 | 13.48 | 603 |
| 1993 | 108,978.30 | 54,241 | 87,342 | 33,624 | 13.79 | 2,438 |
| 1994 | 1,528,540.74 | 739,074 | 1,190,105 | 506,575 | 14.11 | 35,902 |
| 1995 | 630,494.80 | 295,616 | 476,020 | 223,829 | 14.44 | 15,501 |
| 1996 | 530,077.55 | 240,768 | 387,700 | 200,686 | 14.77 | 13,587 |
| 1997 | 1,429,293.16 | 627,625 | 1,010,643 | 575,872 | 15.11 | 38,112 |
| 1998 | 1,109,693.01 | 470,039 | 756,888 | 474,871 | 15.46 | 30,716 |
| 1999 | 232,763.17 | 94,872 | 152,769 | 105,598 | 15.82 | 6,675 |
| 2000 | 1,480,070.67 | 578,950 | 932,263 | 710,615 | 16.19 | 43,892 |
| 2001 | 1,962,927.92 | 735,580 | 1,184,479 | 994,371 | 16.56 | 60,047 |
| 2002 | 1,639,155.44 | 585,867 | 943,401 | 876,062 | 16.95 | 51,685 |
| 2003 | 242,831.69 | 82,480 | 132,815 | 136,728 | 17.35 | 7,881 |
| 2005 | 1,106,121.95 | 333,469 | 536,974 | 690,821 | 18.21 | 37,936 |
| 2006 | 357,925.58 | 100,278 | 161,474 | 235,823 | 18.69 | 12,618 |
| 2007 | 916,657.89 | 236,465 | 380,771 | 636,719 | 19.19 | 33,180 |
| 2008 | 109,011.51 | 25,507 | 41,073 | 79,930 | 19.73 | 4,051 |
| 2009 | 2,637,507.76 | 550,395 | 886,282 | 2,041,352 | 20.30 | 100,559 |
| 2010 | 2,771,772.15 | 503,343 | 810,516 | 2,266,151 | 20.91 | 108,376 |
| 2011 | 3,742,552.77 | 571,623 | 920,465 | 3,233,769 | 21.56 | 149,989 |
| 2012 | 2,407,096.08 | 294,975 | 474,988 | 2,196,889 | 22.24 | 98,781 |
| 2013 | 1,510,549.68 | 136,820 | 220,316 | 1,456,394 | 22.96 | 63,432 |
| 2014 | 6,633,910.89 | 374,073 | 602,357 | 6,761,284 | 23.73 | 284,926 |
| 2015 | 2,431,370.59 | 98,777 | 159,057 | 2,539,764 | 13.16 | 192,991 |
| | 41,897,350.68 | 11,811,438 | 18,893,624 | 27,612,435 | | 1,448,044 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 19.1 3.46

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT D03 - DISCONNECT SWITCHES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R2.5 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1965 | 242,270.77 | 179,805 | 229,620 | 19,919 | 15.37 | 1,296 |
| 1966 | 177,667.19 | 130,095 | 166,138 | 16,859 | 15.90 | 1,060 |
| 1967 | 714,863.43 | 515,954 | 658,899 | 77,410 | 16.46 | 4,703 |
| 1968 | 482,439.40 | 343,143 | 438,211 | 58,702 | 17.02 | 3,449 |
| 1969 | 207,719.11 | 145,486 | 185,793 | 28,158 | 17.60 | 1,600 |
| 1970 | 1,273,238.73 | 877,469 | 1,120,571 | 190,865 | 18.20 | 10,487 |
| 1971 | 232,031.02 | 157,300 | 200,880 | 38,112 | 18.80 | 2,027 |
| 1972 | 280,022.05 | 186,584 | 238,277 | 50,146 | 19.42 | 2,582 |
| 1974 | 160,146.36 | 102,870 | 131,370 | 33,581 | 20.70 | 1,622 |
| 1975 | 172,354.33 | 108,581 | 138,663 | 38,862 | 21.36 | 1,819 |
| 1976 | 21,825.02 | 13,475 | 17,208 | 5,272 | 22.03 | 239 |
| 1977 | 395,853.89 | 239,374 | 305,693 | 102,037 | 22.71 | 4,493 |
| 1978 | 242,505.95 | 143,512 | 183,272 | 66,509 | 23.40 | 2,842 |
| 1979 | 42,312.17 | 24,485 | 31,269 | 12,313 | 24.10 | 511 |
| 1980 | 274,055.46 | 154,945 | 197,872 | 84,405 | 24.81 | 3,402 |
| 1981 | 134,922.49 | 74,463 | 95,093 | 43,877 | 25.53 | 1,719 |
| 1982 | 281,577.30 | 151,552 | 193,539 | 96,486 | 26.26 | 3,674 |
| 1983 | 44,083.42 | 23,116 | 29,520 | 15,886 | 27.00 | 588 |
| 1984 | 44,313.73 | 22,614 | 28,879 | 16,764 | 27.75 | 604 |
| 1985 | 15,913.15 | 7,897 | 10,085 | 6,306 | 28.50 | 221 |
| 1986 | 31,745.19 | 15,297 | 19,535 | 13,163 | 29.27 | 450 |
| 1987 | 151,700.26 | 70,882 | 90,520 | 65,731 | 30.05 | 2,187 |
| 1988 | 132,691.61 | 60,061 | 76,701 | 59,971 | 30.83 | 1,945 |
| 1989 | 502,766.48 | 220,133 | 281,121 | 236,728 | 31.62 | 7,487 |
| 1990 | 481,796.61 | 203,736 | 260,181 | 236,070 | 32.42 | 7,282 |
| 1991 | 36,330.90 | 14,812 | 18,916 | 18,505 | 33.23 | 557 |
| 1992 | 231,030.02 | 90,642 | 115,754 | 122,207 | 34.05 | 3,589 |
| 1993 | 104,983.77 | 39,577 | 50,542 | 57,591 | 34.87 | 1,652 |
| 1994 | 35,727.81 | 12,913 | 16,491 | 20,309 | 35.70 | 569 |
| 1995 | 422,371.06 | 146,018 | 186,472 | 248,570 | 36.54 | 6,803 |
| 1996 | 301,380.12 | 99,447 | 126,999 | 183,423 | 37.38 | 4,907 |
| 1997 | 30,529.45 | 9,588 | 12,244 | 19,201 | 38.23 | 502 |
| 1998 | 166,141.53 | 49,502 | 63,217 | 107,909 | 39.09 | 2,761 |
| 2000 | 170,065.45 | 45,130 | 57,633 | 117,534 | 40.83 | 2,879 |
| 2001 | 96,520.44 | 24,023 | 30,679 | 68,737 | 41.71 | 1,648 |
| 2002 | 187,571.33 | 43,593 | 55,670 | 137,528 | 42.59 | 3,229 |
| 2003 | 129,652.34 | 27,970 | 35,719 | 97,823 | 43.48 | 2,250 |
| 2004 | 157,797.58 | 31,383 | 40,078 | 122,454 | 44.38 | 2,759 |
| 2005 | 187,574.40 | 34,145 | 43,605 | 149,597 | 45.28 | 3,304 |
| 2006 | 35,094.81 | 5,797 | 7,403 | 28,745 | 46.18 | 622 |
| 2009 | 532,335.09 | 60,511 | 77,275 | 471,030 | 48.93 | 9,627 |
| 2010 | 57,070.54 | 5,504 | 7,029 | 51,754 | 49.85 | 1,038 |
| 2011 | 1,097,601.33 | 86,746 | 110,779 | 1,019,750 | 50.78 | 20,082 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT D03 - DISCONNECT SWITCHES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R2.5 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 2012 | 1,533,843.65 | 94,507 | 120,690 | 1,459,169 | 51.71 | 28,218 |
| 2013 | 1,081,960.39 | 47,619 | 60,812 | 1,053,607 | 52.65 | 20,012 |
| 2014 | 2,921,484.67 | 77,696 | 99,222 | 2,909,907 | 53.58 | 54,310 |
| 2015 | 4,625,646.05 | 58,126 | 74,229 | 4,690,186 | 40.32 | 116,324 |
| | 20,883,527.85 | 5,278,078 | 6,740,368 | 14,769,665 | | 355,931 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 41.5 1.70

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT D04 - DYKES AND LINERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 42-L1.5 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1968 | 26,479.96 | 17,309 | 28,598 | | | |
| 1974 | 142,100.00 | 87,075 | 150,013 | 3,455 | 18.17 | 190 |
| 1975 | 213,342.87 | 129,249 | 222,670 | 7,740 | 18.44 | 420 |
| 1980 | 53,900.59 | 30,700 | 52,890 | 5,323 | 19.85 | 268 |
| 1981 | 213,183.92 | 119,779 | 206,355 | 23,884 | 20.15 | 1,185 |
| 1982 | 89,895.87 | 49,816 | 85,823 | 11,265 | 20.45 | 551 |
| 1983 | 68,476.83 | 37,383 | 64,403 | 9,552 | 20.77 | 460 |
| 1985 | 211,511.23 | 111,822 | 192,647 | 35,785 | 21.44 | 1,669 |
| 1987 | 181,989.53 | 92,846 | 159,955 | 36,594 | 22.16 | 1,651 |
| 1990 | 264,232.48 | 126,651 | 218,195 | 67,176 | 23.36 | 2,876 |
| 1992 | 217,059.26 | 99,016 | 170,585 | 63,839 | 24.26 | 2,631 |
| 1998 | 39,596.79 | 14,693 | 25,313 | 17,452 | 27.57 | 633 |
| 1999 | 134,484.01 | 47,654 | 82,098 | 63,145 | 28.22 | 2,238 |
| 2002 | 75,888.45 | 22,812 | 39,301 | 42,659 | 30.31 | 1,407 |
| 2005 | 16,513.92 | 3,996 | 6,884 | 10,951 | 32.59 | 336 |
| 2011 | 478,782.72 | 52,572 | 90,571 | 426,514 | 37.73 | 11,304 |
| 2014 | 49,894.57 | 1,860 | 3,204 | 50,682 | 40.55 | 1,250 |
| | 2,477,333.00 | 1,045,233 | 1,799,505 | 876,014 | | 29,069 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 30.1 1.17

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT E01 - ELEVATORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 45-S5 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1971 | 89,800.00 | 83,327 | 89,800 | 2,694 | 4.46 | 604 |
| | 89,800.00 | 83,327 | 89,800 | 2,694 | | 604 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 4.5 | 0.67 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT E02 - EMS EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 35-R2.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1980 | 16,461.46 | 12,633 | 16,461 | | | |
| 1990 | 11,759,258.77 | 7,132,814 | 11,759,259 | | | |
| 1992 | 12,860.27 | 7,297 | 12,860 | | | |
| 1993 | 48,931.95 | 26,773 | 48,932 | | | |
| 1994 | 229,340.02 | 120,699 | 229,340 | | | |
| 1998 | 99,085.18 | 43,541 | 99,085 | | | |
| 1999 | 45,962.90 | 19,160 | 45,427 | 536 | 20.41 | 26 |
| 2000 | 117,114.88 | 46,109 | 109,322 | 7,793 | 21.22 | 367 |
| 2001 | 299,861.84 | 111,036 | 263,260 | 36,602 | 22.04 | 1,661 |
| 2004 | 8,032.68 | 2,396 | 5,681 | 2,352 | 24.56 | 96 |
| 2005 | 236,118.93 | 64,562 | 153,073 | 83,046 | 25.43 | 3,266 |
| 2009 | 22,360.02 | 3,846 | 9,119 | 13,241 | 28.98 | 457 |
| 2011 | 12,028.86 | 1,443 | 3,421 | 8,608 | 30.80 | 279 |
| 2012 | 9,801.36 | 918 | 2,177 | 7,625 | 31.72 | 240 |
| | 12,917,219.12 | 7,593,227 | 12,757,417 | 159,802 | | 6,392 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 25.0 0.05

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT E03 - ENVIRONMENTAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 45-R2.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1968 | 584,529.60 | 458,920 | 543,919 | 40,611 | 9.67 | 4,200 |
| 1994 | 100,098.42 | 42,220 | 50,040 | 50,058 | 26.02 | 1,924 |
| 1995 | 29,947.59 | 12,099 | 14,340 | 15,608 | 26.82 | 582 |
| 1997 | 129,242.84 | 47,533 | 56,337 | 72,906 | 28.45 | 2,563 |
| 2008 | 71,891.96 | 11,135 | 13,197 | 58,695 | 38.03 | 1,543 |
| 2015 | 20,165.58 | 298 | 354 | 19,812 | 33.17 | 597 |
| | 935,875.99 | 572,205 | 678,187 | 257,689 | | 11,409 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 22.6 1.22

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F01 - FALL ARREST EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 15-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2005 | 198,105.16 | 130,353 | 179,958 | 18,147 | 5.13 | 3,537 |
| 2006 | 217,857.72 | 131,586 | 181,660 | 36,198 | 5.94 | 6,094 |
| 2007 | 195,813.28 | 107,174 | 147,958 | 47,855 | 6.79 | 7,048 |
| 2008 | 199,279.40 | 97,248 | 134,255 | 65,024 | 7.68 | 8,467 |
| 2009 | 501,083.68 | 213,462 | 294,692 | 206,392 | 8.61 | 23,971 |
| 2010 | 43,100.70 | 15,631 | 21,579 | 21,522 | 9.56 | 2,251 |
| 2011 | 205,129.64 | 61,129 | 84,391 | 120,739 | 10.53 | 11,466 |
| 2012 | 184,242.00 | 42,744 | 59,010 | 125,232 | 11.52 | 10,871 |
| 2013 | 246,771.47 | 40,964 | 56,552 | 190,219 | 12.51 | 15,205 |
| 2014 | 336,964.29 | 33,696 | 46,519 | 290,445 | 13.50 | 21,514 |
| 2015 | 180,672.63 | 6,396 | 8,830 | 171,843 | 13.61 | 12,626 |
| | 2,509,019.97 | 880,383 | 1,215,404 | 1,293,616 | | 123,050 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 10.5 4.90

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F02 - FENCING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 52-R3 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1967 | 95,307.91 | 75,041 | 98,167 | | | |
| 1968 | 58,848.45 | 45,705 | 60,614 | | | |
| 1969 | 66,173.02 | 50,660 | 68,158 | | | |
| 1970 | 117,281.68 | 88,440 | 120,800 | | | |
| 1971 | 13,312.00 | 9,883 | 13,711 | | | |
| 1972 | 65,739.16 | 48,010 | 67,711 | | | |
| 1973 | 24,667.06 | 17,707 | 25,407 | | | |
| 1974 | 51,949.96 | 36,633 | 53,508 | | | |
| 1975 | 11,288.90 | 7,813 | 11,628 | | | |
| 1976 | 59,296.08 | 40,251 | 61,075 | | | |
| 1977 | 19,241.61 | 12,802 | 19,819 | | | |
| 1978 | 145,749.97 | 94,952 | 150,122 | | | |
| 1979 | 18,281.62 | 11,653 | 18,637 | 193 | 19.82 | 10 |
| 1980 | 279,753.22 | 174,273 | 278,725 | 9,421 | 20.55 | 458 |
| 1981 | 85,268.34 | 51,885 | 82,983 | 4,843 | 21.28 | 228 |
| 1982 | 189,624.32 | 112,569 | 180,038 | 15,275 | 22.03 | 693 |
| 1983 | 282,397.46 | 163,390 | 261,319 | 29,550 | 22.79 | 1,297 |
| 1984 | 85,097.82 | 47,938 | 76,670 | 10,981 | 23.56 | 466 |
| 1985 | 245,056.33 | 134,261 | 214,731 | 37,677 | 24.34 | 1,548 |
| 1986 | 25,867.46 | 13,767 | 22,018 | 4,625 | 25.13 | 184 |
| 1987 | 213,373.01 | 110,184 | 176,224 | 43,550 | 25.93 | 1,680 |
| 1988 | 75,843.42 | 37,948 | 60,692 | 17,427 | 26.74 | 652 |
| 1989 | 182,675.48 | 88,433 | 141,436 | 46,720 | 27.56 | 1,695 |
| 1990 | 112,235.72 | 52,488 | 83,947 | 31,656 | 28.39 | 1,115 |
| 1991 | 137,599.47 | 62,060 | 99,256 | 42,471 | 29.23 | 1,453 |
| 1992 | 122,833.27 | 53,333 | 85,299 | 41,219 | 30.08 | 1,370 |
| 1993 | 43,943.39 | 18,340 | 29,332 | 15,930 | 30.93 | 515 |
| 1994 | 83,857.05 | 33,552 | 53,662 | 32,711 | 31.80 | 1,029 |
| 1995 | 82,864.42 | 31,727 | 50,743 | 34,607 | 32.67 | 1,059 |
| 1996 | 45,009.81 | 16,440 | 26,293 | 20,067 | 33.56 | 598 |
| 1997 | 57,176.21 | 19,876 | 31,789 | 27,102 | 34.45 | 787 |
| 1998 | 133,014.01 | 43,867 | 70,159 | 66,845 | 35.35 | 1,891 |
| 1999 | 43,860.85 | 13,683 | 21,884 | 23,293 | 36.25 | 643 |
| 2000 | 52,825.13 | 15,527 | 24,833 | 29,577 | 37.16 | 796 |
| 2001 | 163,588.29 | 45,105 | 72,139 | 96,357 | 38.08 | 2,530 |
| 2002 | 50,286.59 | 12,939 | 20,694 | 31,101 | 39.01 | 797 |
| 2003 | 1,015,869.57 | 242,668 | 388,113 | 658,233 | 39.94 | 16,481 |
| 2004 | 32,448.49 | 7,147 | 11,431 | 21,991 | 40.88 | 538 |
| 2005 | 116,002.80 | 23,368 | 37,374 | 82,109 | 41.83 | 1,963 |
| 2006 | 5,454.01 | 996 | 1,593 | 4,025 | 42.78 | 94 |
| 2008 | 58,461.93 | 8,465 | 13,539 | 46,677 | 44.69 | 1,044 |
| 2009 | 255,773.00 | 32,172 | 51,454 | 211,992 | 45.65 | 4,644 |
| 2011 | 813,892.56 | 71,097 | 113,709 | 724,600 | 47.59 | 15,226 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F02 - FENCING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 52-R3 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 2012 | 296,669.35 | 20,155 | 32,235 | 273,334 | 48.57 | 5,628 |
| 2013 | 110,462.43 | 5,383 | 8,609 | 105,167 | 49.54 | 2,123 |
| 2014 | 370,645.31 | 10,865 | 17,377 | 364,388 | 50.52 | 7,213 |
| 2015 | 938,720.95 | 11,022 | 17,629 | 949,254 | 43.55 | 21,797 |
| | 7,555,588.89 | 2,326,473 | 3,627,286 | 4,154,971 | | 100,245 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 41.4 | 1.33 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F03 - FIRE FIGHTING EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 50-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1967 | 597,273.05 | 501,112 | 597,273 | | | |
| 1968 | 39,688.85 | 32,878 | 39,689 | | | |
| 1969 | 101,232.00 | 82,727 | 101,232 | | | |
| 1970 | 9,203.91 | 7,411 | 9,204 | | | |
| 1971 | 281,955.00 | 223,534 | 281,955 | | | |
| 1973 | 21,689.45 | 16,627 | 21,689 | | | |
| 1975 | 10,000.43 | 7,392 | 10,000 | | | |
| 1976 | 58,348.31 | 42,314 | 58,348 | | | |
| 1977 | 28,858.00 | 20,512 | 28,858 | | | |
| 1978 | 192,136.50 | 133,727 | 192,136 | | | |
| 1979 | 115,181.72 | 78,439 | 115,182 | | | |
| 1980 | 214,201.74 | 142,616 | 214,202 | | | |
| 1981 | 9,401.89 | 6,113 | 9,402 | | | |
| 1982 | 406,897.98 | 258,055 | 401,975 | 4,923 | 18.29 | 269 |
| 1983 | 94,674.89 | 58,509 | 91,140 | 3,535 | 19.10 | 185 |
| 1984 | 583,752.17 | 351,185 | 547,045 | 36,707 | 19.92 | 1,843 |
| 1985 | 185,991.75 | 108,768 | 169,429 | 16,563 | 20.76 | 798 |
| 1986 | 152,946.68 | 86,843 | 135,276 | 17,671 | 21.61 | 818 |
| 1987 | 96,794.16 | 53,276 | 82,989 | 13,805 | 22.48 | 614 |
| 1988 | 217,479.69 | 115,873 | 180,497 | 36,983 | 23.36 | 1,583 |
| 1989 | 762,666.44 | 392,773 | 611,828 | 150,838 | 24.25 | 6,220 |
| 1990 | 64,327.11 | 31,971 | 49,802 | 14,525 | 25.15 | 578 |
| 1992 | 149,080.69 | 68,637 | 106,917 | 42,164 | 26.98 | 1,563 |
| 1995 | 24,518.16 | 9,910 | 15,437 | 9,081 | 29.79 | 305 |
| 1997 | 180,253.80 | 65,937 | 102,711 | 77,543 | 31.71 | 2,445 |
| 1998 | 68,518.74 | 23,749 | 36,994 | 31,525 | 32.67 | 965 |
| 1999 | 94,038.17 | 30,769 | 47,929 | 46,109 | 33.64 | 1,371 |
| 2001 | 216,064.47 | 62,227 | 96,932 | 119,132 | 35.60 | 3,346 |
| 2002 | 629,240.42 | 168,888 | 263,079 | 366,161 | 36.58 | 10,010 |
| 2003 | 657,749.39 | 163,648 | 254,916 | 402,833 | 37.56 | 10,725 |
| 2005 | 55,241.78 | 11,557 | 18,002 | 37,240 | 39.54 | 942 |
| 2008 | 238,692.84 | 35,708 | 55,623 | 183,070 | 42.52 | 4,306 |
| 2009 | 1,916,574.45 | 248,771 | 387,514 | 1,529,060 | 43.51 | 35,143 |
| 2010 | 4,415.61 | 485 | 755 | 3,661 | 44.51 | 82 |
| 2011 | 210,565.13 | 18,909 | 29,455 | 181,110 | 45.51 | 3,980 |
| 2012 | 586,212.13 | 41,035 | 63,921 | 522,291 | 46.50 | 11,232 |
| 2013 | 558,076.76 | 27,904 | 43,466 | 514,611 | 47.50 | 10,834 |
| 2014 | 951,159.22 | 28,535 | 44,450 | 906,709 | 48.50 | 18,695 |
| 2015 | 3,121,815.69 | 33,091 | 51,546 | 3,070,269 | 46.45 | 66,098 |
| | 13,906,919.17 | 3,792,415 | 5,568,798 | 8,338,121 | | 194,950 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 42.8 1.40

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F04 - FOOTINGS AND FOUNDATIONS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-R3 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1965 | 167,301.40 | 121,171 | 141,041 | 39,645 | 21.41 | 1,852 |
| 1967 | 1,723,662.79 | 1,209,732 | 1,408,104 | 453,452 | 22.76 | 19,923 |
| 1968 | 891,091.56 | 615,181 | 716,059 | 246,320 | 23.45 | 10,504 |
| 1970 | 490,202.40 | 326,852 | 380,449 | 148,970 | 24.87 | 5,990 |
| 1973 | 14,582.27 | 9,190 | 10,697 | 5,052 | 27.07 | 187 |
| 1974 | 68,284.09 | 42,183 | 49,100 | 24,647 | 27.82 | 886 |
| 1975 | 108,441.06 | 65,621 | 76,382 | 40,734 | 28.58 | 1,425 |
| 1976 | 113,065.81 | 66,973 | 77,955 | 44,156 | 29.35 | 1,504 |
| 1977 | 1,266,265.77 | 733,645 | 853,949 | 513,618 | 30.13 | 17,047 |
| 1978 | 1,106,583.24 | 626,787 | 729,568 | 465,542 | 30.91 | 15,061 |
| 1979 | 334,143.65 | 184,822 | 215,129 | 145,746 | 31.71 | 4,596 |
| 1980 | 540,108.76 | 291,571 | 339,383 | 243,934 | 32.51 | 7,503 |
| 1981 | 299,457.16 | 157,625 | 183,472 | 139,942 | 33.32 | 4,200 |
| 1982 | 471,876.97 | 241,956 | 281,632 | 227,995 | 34.14 | 6,678 |
| 1983 | 766,192.98 | 382,424 | 445,134 | 382,354 | 34.96 | 10,937 |
| 1984 | 7,817.94 | 3,793 | 4,415 | 4,028 | 35.80 | 113 |
| 1985 | 25,845.64 | 12,179 | 14,176 | 13,737 | 36.64 | 375 |
| 1986 | 47,648.73 | 21,780 | 25,352 | 26,109 | 37.49 | 696 |
| 1987 | 307,062.57 | 136,017 | 158,321 | 173,307 | 38.34 | 4,520 |
| 1988 | 115,812.71 | 49,627 | 57,765 | 67,313 | 39.21 | 1,717 |
| 1989 | 340,873.18 | 141,139 | 164,283 | 203,860 | 40.08 | 5,086 |
| 1990 | 1,312,152.51 | 524,336 | 610,317 | 806,808 | 40.95 | 19,702 |
| 1991 | 1,012,711.49 | 389,870 | 453,801 | 639,927 | 41.83 | 15,298 |
| 1992 | 626,613.85 | 231,967 | 270,005 | 406,738 | 42.72 | 9,521 |
| 1993 | 84,738.76 | 30,102 | 35,038 | 56,480 | 43.62 | 1,295 |
| 1994 | 5,426.96 | 1,847 | 2,150 | 3,711 | 44.52 | 83 |
| 1995 | 467,057.62 | 151,871 | 176,775 | 327,647 | 45.43 | 7,212 |
| 1996 | 148,954.64 | 46,183 | 53,756 | 107,115 | 46.34 | 2,312 |
| 1998 | 114,131.79 | 31,897 | 37,127 | 86,135 | 48.18 | 1,788 |
| 1999 | 65,572.18 | 17,312 | 20,151 | 50,667 | 49.11 | 1,032 |
| 2000 | 30,492.18 | 7,574 | 8,816 | 24,116 | 50.05 | 482 |
| 2001 | 33,856.28 | 7,881 | 9,173 | 27,392 | 50.99 | 537 |
| 2002 | 2,625,474.99 | 570,165 | 663,662 | 2,171,851 | 51.93 | 41,823 |
| 2003 | 1,044,934.04 | 210,425 | 244,930 | 883,599 | 52.88 | 16,710 |
| 2004 | 9,714.31 | 1,803 | 2,099 | 8,392 | 53.83 | 156 |
| 2008 | 29,323.54 | 3,571 | 4,157 | 27,512 | 57.67 | 477 |
| 2011 | 40,587.70 | 2,974 | 3,462 | 40,373 | 60.59 | 666 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F04 - FOOTINGS AND FOUNDATIONS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-R3 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 2012 | 22,681.06 | 1,296 | 1,509 | 22,987 | 61.56 | 373 |
| 2014 | 680,260.20 | 16,729 | 19,472 | 715,209 | 63.52 | 11,260 |
| 2015 | 2,852,234.26 | 28,032 | 32,628 | 3,047,785 | 54.45 | 55,974 |
| | 20,413,239.04 | 7,716,103 | 8,981,394 | 13,064,904 | | 307,501 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 42.5 | | | | | | 1.51 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F05 - FREQUENCY CONVERSION

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 45-S4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1977 | 1,607,215.00 | 1,273,991 | 1,590,594 | 16,621 | 9.33 | 1,781 |
| 1982 | 12,043.92 | 8,661 | 10,813 | 1,231 | 12.64 | 97 |
| 2005 | 47,702.22 | 11,130 | 13,896 | 33,806 | 34.50 | 980 |
| 2007 | 28,008.98 | 5,291 | 6,606 | 21,403 | 36.50 | 586 |
| 2009 | 758,606.76 | 109,573 | 136,804 | 621,803 | 38.50 | 16,151 |
| | 2,453,576.88 | 1,408,646 | 1,758,713 | 694,864 | | 19,595 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 35.5 0.80

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F06 - FUEL SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 50-R1.5 | | | | | | |
| NET SALVAGE PERCENT.. -11 | | | | | | |
| 1956 | 11,785.53 | 9,924 | 13,082 | | | |
| 1966 | 73,482.51 | 54,959 | 81,566 | | | |
| 1968 | 828,616.98 | 601,894 | 919,765 | | | |
| 1969 | 757,540.47 | 541,857 | 840,870 | | | |
| 1970 | 800.00 | 563 | 888 | | | |
| 1971 | 87,288.00 | 60,440 | 96,890 | | | |
| 1973 | 3,244.42 | 2,169 | 3,601 | | | |
| 1974 | 290,612.82 | 190,709 | 322,580 | | | |
| 1975 | 44,415.90 | 28,595 | 49,302 | | | |
| 1976 | 212,487.00 | 134,063 | 235,861 | | | |
| 1977 | 16,590.50 | 10,254 | 18,415 | | | |
| 1978 | 128,269.57 | 77,597 | 142,379 | | | |
| 1980 | 179,972.65 | 104,040 | 191,675 | 8,095 | 23.96 | 338 |
| 1981 | 495,612.65 | 279,686 | 515,271 | 34,859 | 24.58 | 1,418 |
| 1982 | 104,546.72 | 57,536 | 106,000 | 10,047 | 25.21 | 399 |
| 1983 | 17,194.91 | 9,223 | 16,992 | 2,094 | 25.84 | 81 |
| 1985 | 205,026.03 | 104,049 | 191,691 | 35,888 | 27.14 | 1,322 |
| 1986 | 24,674.35 | 12,161 | 22,404 | 4,985 | 27.80 | 179 |
| 1987 | 460,163.55 | 219,943 | 405,205 | 105,577 | 28.47 | 3,708 |
| 1988 | 13,928.85 | 6,450 | 11,883 | 3,578 | 29.14 | 123 |
| 1989 | 282,980.18 | 126,711 | 233,442 | 80,666 | 29.83 | 2,704 |
| 1990 | 773,369.43 | 334,448 | 616,160 | 242,280 | 30.52 | 7,938 |
| 1991 | 370,174.16 | 154,332 | 284,329 | 126,564 | 31.22 | 4,054 |
| 1992 | 661,127.69 | 265,361 | 488,879 | 244,973 | 31.92 | 7,675 |
| 1993 | 338,825.34 | 130,656 | 240,710 | 135,386 | 32.63 | 4,149 |
| 1994 | 371,177.35 | 137,198 | 252,762 | 159,245 | 33.35 | 4,775 |
| 1995 | 223,856.04 | 79,166 | 145,849 | 102,631 | 34.07 | 3,012 |
| 1996 | 403,902.53 | 136,293 | 251,095 | 197,237 | 34.80 | 5,668 |
| 1997 | 89,694.14 | 28,813 | 53,083 | 46,477 | 35.53 | 1,308 |
| 1998 | 83,733.99 | 25,523 | 47,021 | 45,924 | 36.27 | 1,266 |
| 1999 | 410,246.57 | 118,215 | 217,790 | 237,584 | 37.02 | 6,418 |
| 2000 | 244,674.28 | 66,431 | 122,387 | 149,201 | 37.77 | 3,950 |
| 2001 | 731,207.43 | 186,353 | 343,322 | 468,318 | 38.52 | 12,158 |
| 2002 | 436,496.97 | 103,879 | 191,378 | 293,134 | 39.28 | 7,463 |
| 2003 | 270,163.44 | 59,676 | 109,942 | 189,939 | 40.05 | 4,743 |
| 2005 | 780,471.63 | 145,716 | 268,455 | 597,869 | 41.59 | 14,375 |
| 2006 | 545,970.78 | 92,480 | 170,378 | 435,650 | 42.37 | 10,282 |
| 2007 | 758,499.28 | 115,345 | 212,502 | 629,432 | 43.15 | 14,587 |
| 2008 | 348,333.75 | 46,862 | 86,335 | 300,315 | 43.94 | 6,835 |
| 2009 | 2,308,883.16 | 270,125 | 497,656 | 2,065,204 | 44.73 | 46,170 |
| 2010 | 535,159.47 | 53,106 | 97,838 | 496,189 | 45.53 | 10,898 |
| 2011 | 1,724,597.41 | 140,510 | 258,864 | 1,655,439 | 46.33 | 35,731 |
| 2012 | 588,452.12 | 37,362 | 68,833 | 584,349 | 47.14 | 12,396 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F06 - FUEL SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 50-R1.5 | | | | | | |
| NET SALVAGE PERCENT.. -11 | | | | | | |
| 2013 | 786,406.17 | 35,789 | 65,935 | 806,976 | 47.95 | 16,830 |
| 2014 | 1,591,994.48 | 43,471 | 80,087 | 1,687,027 | 48.77 | 34,591 |
| 2015 | 8,897,247.05 | 175,792 | 323,865 | 9,552,079 | 27.59 | 346,215 |
| | 28,513,898.25 | 5,615,725 | 9,915,217 | 21,735,210 | | 633,759 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 34.3 | 2.22 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G01 - GAS TURBINE SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 45-R3 | | | | | | |
| NET SALVAGE PERCENT.. -2 | | | | | | |
| 1968 | 995,759.29 | 835,788 | 1,015,674 | | | |
| 1974 | 4,704,054.47 | 3,641,257 | 4,798,136 | | | |
| 1975 | 6,031,773.20 | 4,592,404 | 6,152,409 | | | |
| 1977 | 384,018.97 | 282,286 | 391,699 | | | |
| 1981 | 210,609.85 | 142,595 | 214,822 | | | |
| 1989 | 83,605.00 | 45,519 | 76,732 | 8,545 | 20.98 | 407 |
| 1992 | 13,070,767.89 | 6,405,314 | 10,797,482 | 2,534,701 | 23.38 | 108,413 |
| 1997 | 548,240.40 | 216,099 | 364,280 | 194,925 | 27.61 | 7,060 |
| 1999 | 9,087.69 | 3,220 | 5,428 | 3,841 | 29.37 | 131 |
| 2001 | 61,837.92 | 19,385 | 32,677 | 30,398 | 31.17 | 975 |
| 2007 | 31,100.00 | 5,816 | 9,804 | 21,918 | 36.75 | 596 |
| 2009 | 129,634.16 | 18,600 | 31,354 | 100,873 | 38.67 | 2,609 |
| 2010 | 1,268,695.89 | 154,421 | 260,309 | 1,033,761 | 39.63 | 26,085 |
| 2011 | 222,865.40 | 22,228 | 37,470 | 189,853 | 40.60 | 4,676 |
| 2012 | 376,344.00 | 29,259 | 49,322 | 334,549 | 41.57 | 8,048 |
| 2013 | 7,810,787.00 | 433,724 | 731,131 | 7,235,872 | 42.55 | 170,056 |
| 2014 | 2,091,471.80 | 69,695 | 117,485 | 2,015,816 | 43.53 | 46,309 |
| 2015 | 31,295,107.96 | 418,165 | 704,904 | 31,216,106 | 37.67 | 828,673 |
| | 69,325,760.89 | 17,335,775 | 25,791,118 | 44,921,158 | | 1,204,038 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 37.3 1.74

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G02 - GATES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 80-R4 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1966 | 1,986,152.97 | 1,270,124 | 581,347 | 1,563,698 | 32.63 | 47,922 |
| 1967 | 1,051,672.86 | 660,608 | 302,366 | 833,441 | 33.47 | 24,901 |
| 1970 | 396,402.00 | 235,197 | 107,652 | 320,462 | 36.05 | 8,889 |
| 1978 | 267,693.00 | 132,773 | 60,771 | 228,337 | 43.26 | 5,278 |
| 1979 | 1,419,329.57 | 686,146 | 314,055 | 1,218,821 | 44.19 | 27,581 |
| 1980 | 1,051,492.17 | 495,127 | 226,624 | 908,988 | 45.12 | 20,146 |
| 1982 | 4,123,249.27 | 1,836,373 | 840,525 | 3,612,584 | 47.01 | 76,847 |
| 1983 | 1,976,506.08 | 854,918 | 391,304 | 1,743,323 | 47.96 | 36,350 |
| 1984 | 1,120,133.00 | 470,131 | 215,184 | 994,560 | 48.91 | 20,334 |
| 1985 | 185,213.00 | 75,335 | 34,482 | 165,548 | 49.87 | 3,320 |
| 1986 | 139,462.75 | 54,919 | 25,137 | 125,483 | 50.83 | 2,469 |
| 1988 | 1,014,882.86 | 373,213 | 170,823 | 925,250 | 52.76 | 17,537 |
| 1989 | 180,329.65 | 63,954 | 29,272 | 165,484 | 53.73 | 3,080 |
| 2004 | 439,111.41 | 67,997 | 31,123 | 443,117 | 68.53 | 6,466 |
| 2012 | 32,000.00 | 1,512 | 692 | 33,868 | 76.50 | 443 |
| 2013 | 1,925,734.06 | 64,994 | 29,748 | 2,050,045 | 77.50 | 26,452 |
| 2014 | 321,648.04 | 6,513 | 2,981 | 344,399 | 78.50 | 4,387 |
| 2015 | 1,417,520.75 | 10,104 | 4,625 | 1,526,298 | 74.69 | 20,435 |
| | 19,048,533.44 | 7,359,938 | 3,368,711 | 17,203,705 | | 352,837 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 48.8 1.85

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G03 - GENERATORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-S3 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1966 | 18,139.94 | 13,449 | 12,962 | 6,629 | 20.38 | 325 |
| 1967 | 1,704,660.61 | 1,246,232 | 1,201,125 | 639,908 | 21.00 | 30,472 |
| 1968 | 5,528,661.06 | 3,984,000 | 3,839,801 | 2,131,153 | 21.63 | 98,528 |
| 1970 | 3,447,277.74 | 2,409,118 | 2,321,921 | 1,401,139 | 22.94 | 61,078 |
| 1971 | 1,587,930.00 | 1,091,506 | 1,051,999 | 662,965 | 23.63 | 28,056 |
| 1977 | 3,185,771.51 | 1,953,213 | 1,882,517 | 1,558,116 | 28.10 | 55,449 |
| 1978 | 271,000.00 | 162,505 | 156,623 | 136,057 | 28.91 | 4,706 |
| 1979 | 786,015.97 | 460,629 | 443,957 | 404,940 | 29.73 | 13,621 |
| 1980 | 12,037,307.04 | 6,886,124 | 6,636,884 | 6,363,408 | 30.57 | 208,159 |
| 1982 | 5,671,758.61 | 3,082,535 | 2,970,964 | 3,154,535 | 32.29 | 97,694 |
| 1983 | 177,355.00 | 93,797 | 90,402 | 101,141 | 33.17 | 3,049 |
| 1985 | 9,224,267.93 | 4,601,046 | 4,434,513 | 5,527,696 | 34.98 | 158,024 |
| 1988 | 76,992.57 | 34,847 | 33,586 | 49,566 | 37.76 | 1,313 |
| 1989 | 1,201,412.25 | 524,797 | 505,802 | 791,723 | 38.71 | 20,453 |
| 1990 | 173,110.77 | 72,856 | 70,219 | 116,741 | 39.67 | 2,943 |
| 1992 | 5,093,864.21 | 1,980,494 | 1,908,811 | 3,592,562 | 41.60 | 86,360 |
| 1999 | 165,900.34 | 45,454 | 43,809 | 135,363 | 48.51 | 2,790 |
| 2001 | 97,014.30 | 23,373 | 22,527 | 82,248 | 50.50 | 1,629 |
| 2002 | 36,867.35 | 8,270 | 7,971 | 31,846 | 51.50 | 618 |
| 2003 | 9,985,526.61 | 2,073,942 | 1,998,876 | 8,785,493 | 52.50 | 167,343 |
| 2007 | 28,008.68 | 3,956 | 3,813 | 26,436 | 56.50 | 468 |
| 2008 | 2,209,404.51 | 275,315 | 265,350 | 2,120,807 | 57.50 | 36,884 |
| 2009 | 234,765.50 | 25,355 | 24,437 | 229,110 | 58.50 | 3,916 |
| 2010 | 1,951,761.81 | 178,371 | 171,915 | 1,935,988 | 59.50 | 32,538 |
| 2011 | 450,761.35 | 33,703 | 32,483 | 454,339 | 60.50 | 7,510 |
| 2012 | 1,757,101.50 | 102,190 | 98,491 | 1,799,179 | 61.50 | 29,255 |
| 2013 | 2,362,076.23 | 98,113 | 94,562 | 2,456,480 | 62.50 | 39,304 |
| 2014 | 3,252,441.14 | 81,072 | 78,138 | 3,434,498 | 63.50 | 54,087 |
| 2015 | 32,415,720.45 | 287,074 | 276,683 | 34,732,295 | 60.11 | 577,812 |
| | 105,132,874.98 | 31,833,336 | 30,681,141 | 82,862,364 | | 1,824,384 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 45.4 1.74

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G04 - GENERATOR - WINDINGS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 50-S3 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1967 | 6,417,497.74 | 5,479,568 | 6,930,898 | | | |
| 2010 | 4,435,555.02 | 526,944 | 1,065,837 | 3,724,562 | 44.50 | 83,698 |
| 2012 | 3,882,451.10 | 293,513 | 593,682 | 3,599,365 | 46.50 | 77,406 |
| 2013 | 7,746,727.46 | 418,323 | 846,132 | 7,520,334 | 47.50 | 158,323 |
| 2014 | 2,132,526.63 | 69,094 | 139,755 | 2,163,373 | 48.50 | 44,606 |
| | 24,614,757.95 | 6,787,442 | 9,576,304 | 17,007,634 | | 364,033 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 46.7 1.48

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G05 - GLYCOL SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 40-S3 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1974 | 83,699.00 | 73,785 | 90,395 | | | |
| 1989 | 9,270.24 | 6,217 | 8,119 | 1,893 | 15.16 | 125 |
| 1992 | 437,684.30 | 266,484 | 347,993 | 124,706 | 17.45 | 7,146 |
| | 530,653.54 | 346,486 | 446,507 | 126,599 | | 7,271 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 17.4 1.37

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G06 - GOVENORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 45-S4 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1967 | 62,233.00 | 62,873 | 30,355 | 40,591 | 5.12 | 7,928 |
| 1968 | 77,729.00 | 77,918 | 37,619 | 50,992 | 5.43 | 9,391 |
| 1970 | 63,822.00 | 62,878 | 30,358 | 42,399 | 6.11 | 6,939 |
| 1971 | 77,729.00 | 75,851 | 36,621 | 51,990 | 6.48 | 8,023 |
| 1977 | 143,225.00 | 129,424 | 62,487 | 100,790 | 9.33 | 10,803 |
| 1980 | 251,003.31 | 214,862 | 103,736 | 182,408 | 11.21 | 16,272 |
| 1982 | 2,305,849.08 | 1,890,301 | 912,647 | 1,716,021 | 12.64 | 135,761 |
| 1985 | 1,422,117.29 | 1,079,015 | 520,954 | 1,100,260 | 15.05 | 73,107 |
| 1996 | 11,438.67 | 5,651 | 2,728 | 10,312 | 25.50 | 404 |
| 2002 | 594,634.45 | 203,365 | 98,186 | 579,697 | 31.50 | 18,403 |
| 2003 | 623,150.91 | 197,333 | 95,273 | 615,119 | 32.50 | 18,927 |
| 2006 | 912,512.80 | 219,610 | 106,029 | 934,236 | 35.50 | 26,317 |
| 2009 | 1,295,214.64 | 213,272 | 102,969 | 1,373,576 | 38.50 | 35,677 |
| | 7,840,659.15 | 4,432,353 | 2,139,962 | 6,798,390 | | 367,952 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 18.5 4.69

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G07 - GROUND WIRE SYSTEM

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1966 | 2,823.94 | 2,392 | 2,369 | 624 | 11.05 | 56 |
| 1967 | 181,215.81 | 151,297 | 149,826 | 42,263 | 11.68 | 3,618 |
| 1968 | 94,918.28 | 78,040 | 77,281 | 23,332 | 12.34 | 1,891 |
| 1970 | 172,220.16 | 137,147 | 135,814 | 46,739 | 13.68 | 3,417 |
| 1971 | 53,073.00 | 41,549 | 41,145 | 15,112 | 14.38 | 1,051 |
| 1974 | 221,600.40 | 164,298 | 162,701 | 72,195 | 16.53 | 4,368 |
| 1975 | 47,892.56 | 34,816 | 34,478 | 16,288 | 17.28 | 943 |
| 1976 | 4,623.64 | 3,294 | 3,262 | 1,639 | 18.04 | 91 |
| 1977 | 44,065.95 | 30,735 | 30,436 | 16,274 | 18.81 | 865 |
| 1978 | 237,477.65 | 162,021 | 160,446 | 91,280 | 19.60 | 4,657 |
| 1979 | 76,455.67 | 50,983 | 50,487 | 30,556 | 20.40 | 1,498 |
| 1980 | 369,454.09 | 240,596 | 238,257 | 153,364 | 21.21 | 7,231 |
| 1981 | 72,125.46 | 45,816 | 45,371 | 31,082 | 22.04 | 1,410 |
| 1982 | 346,989.02 | 214,800 | 212,712 | 155,096 | 22.88 | 6,779 |
| 1983 | 352,232.23 | 212,277 | 210,213 | 163,153 | 23.73 | 6,875 |
| 1985 | 455,703.00 | 259,352 | 256,831 | 226,214 | 25.47 | 8,882 |
| 1986 | 29,607.81 | 16,343 | 16,184 | 15,200 | 26.36 | 577 |
| 1987 | 144,022.64 | 77,027 | 76,278 | 76,386 | 27.25 | 2,803 |
| 1988 | 44,015.48 | 22,768 | 22,547 | 24,109 | 28.16 | 856 |
| 1989 | 283,026.53 | 141,385 | 140,010 | 159,998 | 29.08 | 5,502 |
| 1990 | 468,797.25 | 225,877 | 223,681 | 273,244 | 30.00 | 9,108 |
| 1991 | 520,887.35 | 241,639 | 239,290 | 312,851 | 30.93 | 10,115 |
| 1992 | 215,011.55 | 95,848 | 94,916 | 132,996 | 31.87 | 4,173 |
| 1993 | 11,320.04 | 4,839 | 4,792 | 7,207 | 32.82 | 220 |
| 1994 | 5,612.73 | 2,297 | 2,275 | 3,674 | 33.77 | 109 |
| 1995 | 415,398.75 | 162,281 | 160,703 | 279,620 | 34.73 | 8,051 |
| 1996 | 142,553.83 | 53,025 | 52,509 | 98,598 | 35.70 | 2,762 |
| 1997 | 27,653.81 | 9,769 | 9,674 | 19,639 | 36.67 | 536 |
| 1998 | 27,958.88 | 9,354 | 9,263 | 20,373 | 37.64 | 541 |
| 2000 | 109,199.72 | 32,410 | 32,095 | 83,657 | 39.60 | 2,113 |
| 2001 | 353,363.79 | 98,204 | 97,249 | 277,317 | 40.58 | 6,834 |
| 2002 | 63,869.83 | 16,544 | 16,383 | 51,319 | 41.56 | 1,235 |
| 2003 | 408,552.10 | 98,029 | 97,076 | 335,989 | 42.55 | 7,896 |
| 2004 | 9,440.40 | 2,085 | 2,065 | 7,942 | 43.54 | 182 |
| 2005 | 19,932.54 | 4,022 | 3,983 | 17,145 | 44.53 | 385 |
| 2006 | 70,228.07 | 12,817 | 12,692 | 61,750 | 45.53 | 1,356 |
| 2008 | 1,052,859.55 | 151,780 | 150,305 | 965,726 | 47.52 | 20,323 |
| 2009 | 174,838.48 | 21,869 | 21,656 | 163,673 | 48.51 | 3,374 |
| 2010 | 267,722.45 | 28,327 | 28,052 | 255,734 | 49.51 | 5,165 |
| 2011 | 277,276.56 | 23,995 | 23,762 | 270,151 | 50.51 | 5,348 |
| 2012 | 741,955.69 | 50,051 | 49,564 | 736,909 | 51.50 | 14,309 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G07 - GROUND WIRE SYSTEM

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 2013 | 642,861.66 | 30,971 | 30,670 | 650,763 | 52.50 | 12,395 |
| 2014 | 541,315.19 | 15,647 | 15,495 | 558,299 | 53.50 | 10,435 |
| 2015 | 568,198.08 | 5,842 | 5,785 | 596,505 | 51.05 | 11,685 |
| | 10,370,351.62 | 3,484,458 | 3,450,583 | 7,541,990 | | 202,020 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 37.3 | 1.95 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT I02 - INSTRUMENTATION

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 30-L0.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1968 | 1,270,122.22 | 798,056 | 1,270,122 | | | |
| 1969 | 533,320.62 | 331,192 | 533,321 | | | |
| 1971 | 1,562,828.30 | 947,074 | 1,562,828 | | | |
| 1979 | 25,332.75 | 13,688 | 25,333 | | | |
| 1987 | 19,531.16 | 9,062 | 19,531 | | | |
| 1988 | 172,549.37 | 78,280 | 172,549 | | | |
| 1989 | 19,048.01 | 8,438 | 19,048 | | | |
| 1990 | 518,407.16 | 224,123 | 518,407 | | | |
| 1992 | 19,933.21 | 8,179 | 19,309 | 624 | 17.69 | 35 |
| 1994 | 104,218.77 | 40,367 | 95,298 | 8,921 | 18.38 | 485 |
| 1999 | 356,341.34 | 116,167 | 274,244 | 82,097 | 20.22 | 4,060 |
| 2002 | 18,448.05 | 5,258 | 12,413 | 6,035 | 21.45 | 281 |
| 2005 | 47,283.46 | 11,222 | 26,493 | 20,790 | 22.88 | 909 |
| 2006 | 497,358.78 | 109,419 | 258,314 | 239,045 | 23.40 | 10,216 |
| 2009 | 418,330.78 | 67,489 | 159,326 | 259,005 | 25.16 | 10,294 |
| 2012 | 45,371.19 | 4,250 | 10,033 | 35,338 | 27.19 | 1,300 |
| 2014 | 338,972.40 | 14,464 | 34,147 | 304,826 | 28.72 | 10,614 |
| | 5,967,397.57 | 2,786,728 | 5,010,716 | 956,682 | | 38,194 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 25.0 0.64

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT I03 - INSULATORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 35-L3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1967 | 88,700.61 | 69,440 | 82,281 | 6,420 | 7.60 | 845 |
| 1968 | 114,208.17 | 88,560 | 104,936 | 9,272 | 7.86 | 1,180 |
| 1969 | 50,398.83 | 38,706 | 45,863 | 4,536 | 8.12 | 559 |
| 1970 | 96,375.98 | 73,301 | 86,855 | 9,521 | 8.38 | 1,136 |
| 1974 | 12,479.49 | 9,156 | 10,849 | 1,630 | 9.32 | 175 |
| 1975 | 514.00 | 374 | 443 | 71 | 9.53 | 7 |
| 1976 | 12,341.27 | 8,910 | 10,558 | 1,783 | 9.73 | 183 |
| 1977 | 50,283.33 | 36,032 | 42,695 | 7,588 | 9.92 | 765 |
| 1978 | 35,427.46 | 25,214 | 29,876 | 5,551 | 10.09 | 550 |
| 1979 | 14,781.95 | 10,449 | 12,381 | 2,401 | 10.26 | 234 |
| 1980 | 11,311.61 | 7,941 | 9,409 | 1,903 | 10.43 | 182 |
| 1981 | 69,020.58 | 48,137 | 57,038 | 11,983 | 10.59 | 1,132 |
| 1982 | 426,433.41 | 295,216 | 349,806 | 76,627 | 10.77 | 7,115 |
| 1983 | 630,479.97 | 433,051 | 513,129 | 117,351 | 10.96 | 10,707 |
| 1984 | 70,036.88 | 47,705 | 56,526 | 13,511 | 11.16 | 1,211 |
| 1985 | 999,174.39 | 673,733 | 798,317 | 200,857 | 11.40 | 17,619 |
| 1986 | 7,562.44 | 5,043 | 5,976 | 1,586 | 11.66 | 136 |
| 1987 | 533,947.06 | 351,492 | 416,488 | 117,459 | 11.96 | 9,821 |
| 1988 | 575,583.15 | 373,145 | 442,145 | 133,438 | 12.31 | 10,840 |
| 1989 | 600,838.56 | 382,818 | 453,607 | 147,232 | 12.70 | 11,593 |
| 1990 | 3,212,707.83 | 2,006,561 | 2,377,605 | 835,103 | 13.14 | 63,554 |
| 1991 | 1,700,167.83 | 1,038,071 | 1,230,027 | 470,141 | 13.63 | 34,493 |
| 1992 | 767,820.50 | 456,961 | 541,460 | 226,360 | 14.17 | 15,975 |
| 1993 | 1,189,492.76 | 687,527 | 814,661 | 374,832 | 14.77 | 25,378 |
| 1994 | 969,319.30 | 542,538 | 642,862 | 326,457 | 15.41 | 21,185 |
| 1995 | 1,758,689.02 | 949,692 | 1,125,305 | 633,384 | 16.10 | 39,341 |
| 1996 | 1,786,367.83 | 926,875 | 1,098,269 | 688,099 | 16.84 | 40,861 |
| 1997 | 889,877.07 | 442,144 | 523,903 | 365,974 | 17.61 | 20,782 |
| 1998 | 720,448.60 | 341,284 | 404,393 | 316,056 | 18.42 | 17,158 |
| 1999 | 1,020,689.48 | 459,310 | 544,244 | 476,445 | 19.25 | 24,750 |
| 2000 | 3,892,028.71 | 1,655,786 | 1,961,967 | 1,930,062 | 20.11 | 95,975 |
| 2001 | 681,643.97 | 273,046 | 323,536 | 358,108 | 20.98 | 17,069 |
| 2002 | 1,987,065.50 | 744,871 | 882,609 | 1,104,456 | 21.88 | 50,478 |
| 2003 | 1,841,341.62 | 642,370 | 761,154 | 1,080,188 | 22.79 | 47,397 |
| 2004 | 2,775,970.27 | 895,445 | 1,061,027 | 1,714,943 | 23.71 | 72,330 |
| 2005 | 333,171.22 | 98,522 | 116,740 | 216,431 | 24.65 | 8,780 |
| 2006 | 1,324,258.63 | 355,656 | 421,422 | 902,837 | 25.60 | 35,267 |
| 2007 | 3,136,964.12 | 756,448 | 896,327 | 2,240,637 | 26.56 | 84,361 |
| 2008 | 808,745.61 | 172,611 | 204,530 | 604,216 | 27.53 | 21,948 |
| 2009 | 2,123,592.33 | 393,162 | 465,864 | 1,657,728 | 28.52 | 58,125 |
| 2010 | 323,890.26 | 50,805 | 60,200 | 263,690 | 29.51 | 8,936 |
| 2011 | 490,774.50 | 63,099 | 74,767 | 416,008 | 30.50 | 13,640 |
| 2012 | 994,068.55 | 99,407 | 117,789 | 876,280 | 31.50 | 27,818 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT I03 - INSULATORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 35-L3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2013 | 105,635.07 | 7,546 | 8,941 | 96,694 | 32.50 | 2,975 |
| 2014 | 2,685,733.84 | 115,111 | 136,397 | 2,549,337 | 33.50 | 76,100 |
| 2015 | 67,958.16 | 1,101 | 1,304 | 66,654 | 30.46 | 2,188 |
| | 41,988,321.72 | 17,154,372 | 20,326,481 | 21,661,840 | | 1,002,854 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 21.6 | 2.39 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT I04 - INTAKE STRUCTURES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 110-R4 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1966 | 3,784,392.00 | 1,805,782 | 562,054 | 3,525,089 | 61.40 | 57,412 |
| 1967 | 1,784,000.00 | 834,790 | 259,831 | 1,666,889 | 62.34 | 26,739 |
| 1979 | 1,454,249.47 | 516,583 | 160,788 | 1,409,801 | 73.82 | 19,098 |
| 1982 | 5,039,574.77 | 1,645,667 | 512,218 | 4,930,523 | 76.74 | 64,250 |
| 1983 | 16,004.48 | 5,072 | 1,579 | 15,706 | 77.72 | 202 |
| 1984 | 3,401,783.55 | 1,045,416 | 325,388 | 3,348,538 | 78.70 | 42,548 |
| 1989 | 6,768.76 | 1,753 | 546 | 6,764 | 83.62 | 81 |
| 1994 | 5,240.80 | 1,103 | 343 | 5,317 | 88.57 | 60 |
| 1997 | 10,571.59 | 1,915 | 596 | 10,821 | 91.55 | 118 |
| 2002 | 24,045.32 | 3,180 | 990 | 24,979 | 96.53 | 259 |
| 2003 | 3,909,814.02 | 479,054 | 149,107 | 4,073,492 | 97.52 | 41,771 |
| | 19,436,444.76 | 6,340,315 | 1,973,440 | 19,017,921 | | 252,538 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 75.3 1.30

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT I05 - INVERTERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 25-S1.5 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1968 | 182,290.86 | 191,677 | 183,692 | 13,182 | 0.66 | 13,182 |
| 1979 | 114,154.89 | 106,126 | 101,704 | 21,583 | 3.48 | 6,202 |
| 1996 | 17,604.84 | 11,667 | 11,181 | 7,832 | 9.66 | 811 |
| 2000 | 11,968.11 | 6,763 | 6,481 | 6,445 | 11.92 | 541 |
| 2001 | 110,955.28 | 59,676 | 57,190 | 62,642 | 12.55 | 4,991 |
| 2005 | 2,340.00 | 970 | 930 | 1,597 | 15.40 | 104 |
| 2006 | 16,272.78 | 6,186 | 5,928 | 11,647 | 16.20 | 719 |
| 2008 | 5,505.60 | 1,696 | 1,625 | 4,321 | 17.87 | 242 |
| 2012 | 4,964.72 | 740 | 709 | 4,653 | 21.55 | 216 |
| 2014 | 5,643.32 | 366 | 351 | 5,744 | 23.50 | 244 |
| 2015 | 49,804.41 | 1,296 | 1,242 | 52,546 | 20.25 | 2,595 |
| | 521,504.81 | 387,163 | 371,033 | 192,192 | | 29,847 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 6.4 5.72

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT L03 - LAND IMPROVEMENTS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 75-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1965 | 5,754.24 | 3,441 | 5,754 | | | |
| 1967 | 174,343.48 | 100,793 | 174,343 | | | |
| 1968 | 82,098.79 | 46,643 | 82,099 | | | |
| 1970 | 313,594.10 | 171,765 | 313,594 | | | |
| 1971 | 996,777.00 | 535,598 | 979,075 | 17,702 | 34.70 | 510 |
| 1972 | 286,219.42 | 150,780 | 275,626 | 10,593 | 35.49 | 298 |
| 1974 | 262,393.06 | 132,666 | 242,514 | 19,879 | 37.08 | 536 |
| 1975 | 59,952.49 | 29,672 | 54,241 | 5,711 | 37.88 | 151 |
| 1976 | 61,289.90 | 29,664 | 54,226 | 7,064 | 38.70 | 183 |
| 1977 | 391,514.65 | 185,214 | 338,572 | 52,943 | 39.52 | 1,340 |
| 1978 | 777,770.02 | 359,431 | 657,041 | 120,729 | 40.34 | 2,993 |
| 1979 | 37,126.06 | 16,741 | 30,603 | 6,523 | 41.18 | 158 |
| 1980 | 1,053,203.62 | 463,125 | 846,594 | 206,610 | 42.02 | 4,917 |
| 1981 | 271,954.44 | 116,541 | 213,037 | 58,917 | 42.86 | 1,375 |
| 1982 | 516,244.80 | 215,310 | 393,588 | 122,657 | 43.72 | 2,806 |
| 1983 | 260,255.97 | 105,594 | 193,026 | 67,230 | 44.57 | 1,508 |
| 1984 | 96,772.74 | 38,141 | 69,722 | 27,051 | 45.44 | 595 |
| 1985 | 252,388.80 | 96,546 | 176,486 | 75,903 | 46.31 | 1,639 |
| 1986 | 85,530.68 | 31,726 | 57,995 | 27,536 | 47.18 | 584 |
| 1987 | 569,158.86 | 204,368 | 373,586 | 195,573 | 48.07 | 4,069 |
| 1988 | 188,757.84 | 65,561 | 119,846 | 68,912 | 48.95 | 1,408 |
| 1989 | 2,213,223.50 | 742,160 | 1,356,671 | 856,552 | 49.85 | 17,183 |
| 1990 | 765,815.64 | 247,718 | 452,829 | 312,987 | 50.74 | 6,168 |
| 1991 | 440,749.89 | 137,219 | 250,837 | 189,913 | 51.65 | 3,677 |
| 1992 | 569,666.82 | 170,444 | 311,572 | 258,095 | 52.56 | 4,910 |
| 1993 | 226,860.93 | 65,125 | 119,049 | 107,812 | 53.47 | 2,016 |
| 1994 | 187,262.38 | 51,460 | 94,069 | 93,193 | 54.39 | 1,713 |
| 1995 | 344,790.90 | 90,518 | 165,467 | 179,324 | 55.31 | 3,242 |
| 1996 | 255,875.08 | 64,002 | 116,996 | 138,879 | 56.24 | 2,469 |
| 1997 | 24,438.72 | 5,810 | 10,621 | 13,818 | 57.17 | 242 |
| 1998 | 321,505.42 | 72,403 | 132,353 | 189,152 | 58.11 | 3,255 |
| 1999 | 117,692.64 | 25,030 | 45,755 | 71,938 | 59.05 | 1,218 |
| 2000 | 73,029.87 | 14,615 | 26,716 | 46,314 | 59.99 | 772 |
| 2002 | 172,683.92 | 30,185 | 55,178 | 117,506 | 61.89 | 1,899 |
| 2003 | 228,663.43 | 37,073 | 67,770 | 160,893 | 62.84 | 2,560 |
| 2004 | 102,617.32 | 15,324 | 28,012 | 74,605 | 63.80 | 1,169 |
| 2005 | 87,428.65 | 11,937 | 21,821 | 65,608 | 64.76 | 1,013 |
| 2006 | 110,490.47 | 13,657 | 24,965 | 85,525 | 65.73 | 1,301 |
| 2008 | 64,541.12 | 6,317 | 11,548 | 52,993 | 67.66 | 783 |
| 2009 | 268,364.85 | 22,792 | 41,664 | 226,701 | 68.63 | 3,303 |
| 2010 | 13,384.00 | 962 | 1,759 | 11,625 | 69.61 | 167 |
| 2011 | 64,779.67 | 3,817 | 6,977 | 57,803 | 70.58 | 819 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT L03 - LAND IMPROVEMENTS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 75-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2012 | 49,683.60 | 2,279 | 4,166 | 45,518 | 71.56 | 636 |
| 2014 | 369,783.31 | 7,296 | 13,337 | 356,446 | 73.52 | 4,848 |
| 2015 | 380,361.34 | 3,005 | 5,493 | 374,868 | 62.79 | 5,970 |
| | 14,196,794.43 | 4,940,468 | 9,017,193 | 5,179,601 | | 96,403 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 53.7 0.68

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT L04 - LIGHTING SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 50-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1967 | 45,238.49 | 37,955 | 45,238 | | | |
| 1968 | 2,726.81 | 2,259 | 2,727 | | | |
| 1970 | 42,486.22 | 34,210 | 42,486 | | | |
| 1971 | 28,226.00 | 22,378 | 28,226 | | | |
| 1974 | 16,618.25 | 12,514 | 16,618 | | | |
| 1975 | 39,752.16 | 29,385 | 39,752 | | | |
| 1976 | 4,407.08 | 3,196 | 4,407 | | | |
| 1977 | 29,959.51 | 21,295 | 29,960 | | | |
| 1978 | 67,894.94 | 47,255 | 67,035 | 860 | 15.20 | 57 |
| 1979 | 83,571.46 | 56,912 | 80,735 | 2,836 | 15.95 | 178 |
| 1980 | 25,900.92 | 17,245 | 24,464 | 1,437 | 16.71 | 86 |
| 1981 | 9,888.87 | 6,430 | 9,122 | 767 | 17.49 | 44 |
| 1982 | 33,845.59 | 21,465 | 30,450 | 3,396 | 18.29 | 186 |
| 1983 | 10,991.30 | 6,793 | 9,636 | 1,355 | 19.10 | 71 |
| 1985 | 3,562.54 | 2,083 | 2,955 | 608 | 20.76 | 29 |
| 1986 | 5,857.33 | 3,326 | 4,718 | 1,139 | 21.61 | 53 |
| 1987 | 39,322.35 | 21,643 | 30,702 | 8,620 | 22.48 | 383 |
| 1988 | 9,837.24 | 5,241 | 7,435 | 2,402 | 23.36 | 103 |
| 1989 | 18,023.88 | 9,282 | 13,167 | 4,857 | 24.25 | 200 |
| 1990 | 35,606.52 | 17,696 | 25,104 | 10,503 | 25.15 | 418 |
| 1991 | 18,831.10 | 9,016 | 12,790 | 6,041 | 26.06 | 232 |
| 1992 | 2,735.87 | 1,260 | 1,787 | 949 | 26.98 | 35 |
| 2012 | 93,027.28 | 6,512 | 9,238 | 83,789 | 46.50 | 1,802 |
| 2013 | 257,991.58 | 12,900 | 18,300 | 239,692 | 47.50 | 5,046 |
| | 926,303.29 | 408,251 | 557,052 | 369,251 | | 8,923 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 41.4 0.96

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT L05 - LIGHTNING ARRESTORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 58-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1967 | 44,408.00 | 31,476 | 44,408 | | | |
| 1968 | 50,362.17 | 35,149 | 50,362 | | | |
| 1970 | 61,016.99 | 41,229 | 61,017 | | | |
| 1977 | 65.00 | 38 | 62 | 3 | 23.72 | |
| 1978 | 19,225.18 | 11,114 | 18,190 | 1,035 | 24.47 | 42 |
| 1980 | 290.19 | 160 | 262 | 28 | 25.99 | 1 |
| 1981 | 2,066.49 | 1,113 | 1,822 | 244 | 26.77 | 9 |
| 1982 | 25,686.00 | 13,485 | 22,070 | 3,616 | 27.55 | 131 |
| 1986 | 5,702.63 | 2,675 | 4,378 | 1,325 | 30.79 | 43 |
| 1987 | 293.76 | 134 | 219 | 75 | 31.62 | 2 |
| 1988 | 811.34 | 357 | 584 | 227 | 32.45 | 7 |
| 1989 | 339.63 | 145 | 237 | 103 | 33.30 | 3 |
| 1992 | 0.01 | | | | | |
| 1994 | 2,591.45 | 909 | 1,488 | 1,103 | 37.65 | 29 |
| 1995 | 0.03 | | | | | |
| 1996 | 2,464.63 | 789 | 1,291 | 1,174 | 39.44 | 30 |
| 2000 | 5,055,707.52 | 1,298,811 | 2,125,676 | 2,930,032 | 43.10 | 67,982 |
| 2004 | 11,440.48 | 2,199 | 3,599 | 7,841 | 46.85 | 167 |
| 2005 | 79,719.06 | 14,019 | 22,944 | 56,775 | 47.80 | 1,188 |
| 2006 | 90,109.92 | 14,355 | 23,494 | 66,616 | 48.76 | 1,366 |
| 2007 | 13,132.00 | 1,875 | 3,069 | 10,063 | 49.72 | 202 |
| 2008 | 52,590.01 | 6,637 | 10,862 | 41,728 | 50.68 | 823 |
| 2009 | 80,001.12 | 8,759 | 14,335 | 65,666 | 51.65 | 1,271 |
| 2010 | 22,899.74 | 2,124 | 3,476 | 19,424 | 52.62 | 369 |
| 2011 | 57,338.86 | 4,359 | 7,134 | 50,205 | 53.59 | 937 |
| 2012 | 86,164.40 | 5,096 | 8,340 | 77,824 | 54.57 | 1,426 |
| 2013 | 17,692.67 | 750 | 1,228 | 16,465 | 55.54 | 296 |
| 2014 | 90,140.65 | 2,300 | 3,764 | 86,377 | 56.52 | 1,528 |
| 2015 | 321,349.88 | 3,278 | 5,365 | 315,985 | 48.52 | 6,512 |
| | 6,193,609.81 | 1,503,335 | 2,439,676 | 3,753,934 | | 84,364 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 44.5 1.36

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT L06 - LINE COUPLING EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 24-R5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1984 | 11,225.56 | 11,071 | 11,226 | | | |
| | 11,225.56 | 11,071 | 11,226 | | | |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 0.0 | 0.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M01 - MAIN BREAKERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 42-R0.5 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1968 | 87,097.27 | 59,172 | 94,065 | | | |
| 1970 | 6,264.96 | 4,110 | 6,766 | | | |
| 1980 | 14,200.00 | 7,533 | 12,753 | 2,583 | 21.37 | 121 |
| 1983 | 14,000.00 | 6,862 | 11,617 | 3,503 | 22.94 | 153 |
| 1986 | 14,774.50 | 6,626 | 11,217 | 4,739 | 24.56 | 193 |
| 1991 | 4,678.14 | 1,762 | 2,983 | 2,069 | 27.35 | 76 |
| 1996 | 96,202.47 | 29,117 | 49,292 | 54,607 | 30.23 | 1,806 |
| 1997 | 4,516.36 | 1,298 | 2,197 | 2,681 | 30.82 | 87 |
| 1998 | 23,610.58 | 6,429 | 10,884 | 14,615 | 31.41 | 465 |
| 2001 | 47,957.90 | 10,864 | 18,391 | 33,404 | 33.19 | 1,006 |
| 2003 | 92,548.49 | 18,134 | 30,699 | 69,253 | 34.38 | 2,014 |
| 2004 | 27,895.94 | 5,036 | 8,525 | 21,603 | 34.98 | 618 |
| 2006 | 119,193.09 | 17,838 | 30,198 | 98,531 | 36.18 | 2,723 |
| | 552,939.70 | 174,781 | 289,587 | 307,588 | | 9,262 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 33.2 1.68

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M02 - MARINE TERMINAL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1969 | 2,596,299.63 | 1,843,479 | 2,752,078 | | | |
| 1971 | 69,000.00 | 47,237 | 73,140 | | | |
| 1980 | 12,849.36 | 7,213 | 13,620 | | | |
| 1983 | 11,371.66 | 5,882 | 12,054 | | | |
| 1984 | 286,814.46 | 144,061 | 304,023 | | | |
| 2013 | 857,536.19 | 34,960 | 74,628 | 834,360 | 62.50 | 13,350 |
| | 3,833,871.30 | 2,082,832 | 3,229,543 | 834,360 | | 13,350 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 62.5 0.35

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M03 - METALCLAD SWITCHGEAR CUB/EQU 4kv/600

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 45-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1968 | 431,573.00 | 401,249 | 457,467 | | | |
| 1980 | 780,388.00 | 599,083 | 814,153 | 13,058 | 12.41 | 1,052 |
| 1987 | 56,409.27 | 36,129 | 49,099 | 10,695 | 17.81 | 601 |
| 1994 | 567,211.45 | 281,118 | 382,040 | 219,204 | 23.96 | 9,149 |
| 1995 | 14,288.77 | 6,769 | 9,199 | 5,947 | 24.89 | 239 |
| 2015 | 383,774.09 | 4,800 | 6,523 | 400,277 | 41.70 | 9,599 |
| | 2,233,644.58 | 1,329,148 | 1,718,481 | 649,182 | | 20,640 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 31.5 0.92

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M04 - METER TEST SWITCHES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 35-R5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1981 | 9,277.57 | 8,294 | 9,278 | | | |
| 1982 | 1,993.00 | 1,753 | 1,978 | 15 | 4.21 | 4 |
| 1984 | 897.55 | 760 | 858 | 40 | 5.36 | 7 |
| 1987 | 11,856.77 | 9,326 | 10,525 | 1,332 | 7.47 | 178 |
| 1988 | 3,304.10 | 2,525 | 2,850 | 454 | 8.25 | 55 |
| 1991 | 12,722.44 | 8,789 | 9,918 | 2,804 | 10.82 | 259 |
| 1993 | 1,215.96 | 776 | 876 | 340 | 12.65 | 27 |
| 1994 | 11,342.69 | 6,935 | 7,826 | 3,517 | 13.60 | 259 |
| 1997 | 5,690.51 | 3,005 | 3,391 | 2,299 | 16.52 | 139 |
| | 58,300.59 | 42,163 | 47,500 | 10,800 | | 928 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 11.6 1.59

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M05 - METERING TANKS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 37-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1966 | 2,500.00 | 2,281 | 2,500 | | | |
| 1968 | 7,113.61 | 6,391 | 7,114 | | | |
| 1970 | 3,981.00 | 3,516 | 3,981 | | | |
| 1972 | 7,362.00 | 6,381 | 7,362 | | | |
| 1978 | 5,434.41 | 4,372 | 5,390 | 44 | 7.23 | 6 |
| 1979 | 8,161.00 | 6,463 | 7,968 | 193 | 7.70 | 25 |
| 1981 | 131,092.38 | 100,197 | 123,537 | 7,555 | 8.72 | 866 |
| 1983 | 5,347.32 | 3,925 | 4,839 | 508 | 9.84 | 52 |
| 1984 | 11,116.01 | 7,983 | 9,843 | 1,273 | 10.43 | 122 |
| 1988 | 13,825.07 | 8,956 | 11,042 | 2,783 | 13.03 | 214 |
| 1989 | 11,884.85 | 7,475 | 9,216 | 2,669 | 13.73 | 194 |
| 1992 | 17,501.52 | 9,966 | 12,288 | 5,214 | 15.93 | 327 |
| 1993 | 36,142.64 | 19,839 | 24,460 | 11,683 | 16.69 | 700 |
| 1994 | 21,417.03 | 11,299 | 13,931 | 7,486 | 17.48 | 428 |
| 1996 | 14,331.25 | 6,941 | 8,558 | 5,773 | 19.08 | 303 |
| 1997 | 1,246.12 | 576 | 710 | 536 | 19.90 | 27 |
| 2011 | 66,568.46 | 7,898 | 9,738 | 56,830 | 32.61 | 1,743 |
| 2012 | 59,915.40 | 5,554 | 6,848 | 53,067 | 33.57 | 1,581 |
| 2013 | 95,443.06 | 6,320 | 7,792 | 87,651 | 34.55 | 2,537 |
| 2014 | 140,033.36 | 5,564 | 6,860 | 133,174 | 35.53 | 3,748 |
| | 660,416.49 | 231,897 | 283,977 | 376,440 | | 12,873 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 29.2 1.95

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M06 - METERS - DIGITAL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 20-L3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1990 | 22,825.78 | 17,222 | 17,997 | 4,829 | 4.91 | 984 |
| 1991 | 374,351.59 | 277,956 | 290,461 | 83,891 | 5.15 | 16,290 |
| 1992 | 134,335.27 | 98,266 | 102,687 | 31,648 | 5.37 | 5,893 |
| 1993 | 3,358.12 | 2,423 | 2,532 | 826 | 5.57 | 148 |
| 1994 | 86,708.38 | 61,780 | 64,559 | 22,149 | 5.75 | 3,852 |
| 1995 | 19,048.53 | 13,410 | 14,013 | 5,036 | 5.92 | 851 |
| 1996 | 51,918.38 | 36,109 | 37,734 | 14,184 | 6.09 | 2,329 |
| 1997 | 116,144.02 | 79,733 | 83,320 | 32,824 | 6.27 | 5,235 |
| 1998 | 149,674.43 | 101,105 | 105,654 | 44,020 | 6.49 | 6,783 |
| 1999 | 89,708.70 | 59,342 | 62,012 | 27,697 | 6.77 | 4,091 |
| 2000 | 22,935.00 | 14,782 | 15,447 | 7,488 | 7.11 | 1,053 |
| 2001 | 149,440.00 | 93,101 | 97,290 | 52,150 | 7.54 | 6,916 |
| 2002 | 193,794.17 | 115,695 | 120,900 | 72,894 | 8.06 | 9,044 |
| 2003 | 64,795.71 | 36,707 | 38,358 | 26,438 | 8.67 | 3,049 |
| 2004 | 202,181.96 | 107,561 | 112,400 | 89,782 | 9.36 | 9,592 |
| 2005 | 100,278.86 | 49,538 | 51,767 | 48,512 | 10.12 | 4,794 |
| 2006 | 59,047.43 | 26,748 | 27,951 | 31,096 | 10.94 | 2,842 |
| 2007 | 88,321.99 | 36,212 | 37,841 | 50,481 | 11.80 | 4,278 |
| 2008 | 72,758.52 | 26,593 | 27,789 | 44,970 | 12.69 | 3,544 |
| 2009 | 1,436,699.35 | 459,025 | 479,677 | 957,022 | 13.61 | 70,318 |
| 2010 | 394,115.26 | 107,199 | 112,022 | 282,093 | 14.56 | 19,375 |
| 2011 | 308,158.46 | 69,027 | 72,133 | 236,025 | 15.52 | 15,208 |
| 2012 | 521,108.69 | 90,933 | 95,024 | 426,085 | 16.51 | 25,808 |
| 2013 | 711,833.66 | 88,979 | 92,982 | 618,852 | 17.50 | 35,363 |
| 2014 | 89,571.49 | 6,718 | 7,020 | 82,551 | 18.50 | 4,462 |
| 2015 | 411,554.67 | 11,647 | 12,171 | 399,384 | 17.17 | 23,261 |
| | 5,874,668.42 | 2,087,811 | 2,181,741 | 3,692,927 | | 285,363 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 12.9 4.86

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M07 - METERS - ANALOGUE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 25-L2 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1981 | 138,968.27 | 97,889 | 138,968 | | | |
| 1983 | 11,142.31 | 7,626 | 11,097 | 45 | 7.89 | 6 |
| 1984 | 56,507.73 | 38,109 | 55,455 | 1,053 | 8.14 | 129 |
| 1987 | 145,955.65 | 94,054 | 136,866 | 9,090 | 8.89 | 1,022 |
| 1988 | 197,071.51 | 125,101 | 182,045 | 15,027 | 9.13 | 1,646 |
| 1989 | 148,738.52 | 92,991 | 135,318 | 13,420 | 9.37 | 1,432 |
| | 698,383.99 | 455,770 | 659,749 | 38,635 | | 4,235 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 9.1 0.61

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M08 - METERS - OTHER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 22-L4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1987 | 450.00 | 385 | 411 | 39 | 3.18 | 12 |
| 1988 | 11,760.00 | 9,942 | 10,612 | 1,148 | 3.40 | 338 |
| 1993 | 8,812.52 | 7,110 | 7,589 | 1,224 | 4.25 | 288 |
| 1994 | 13,132.41 | 10,494 | 11,201 | 1,931 | 4.42 | 437 |
| 1995 | 22,190.79 | 17,501 | 18,680 | 3,511 | 4.65 | 755 |
| 1996 | 16,112.88 | 12,466 | 13,306 | 2,807 | 4.98 | 564 |
| 1997 | 39,570.21 | 29,822 | 31,831 | 7,739 | 5.42 | 1,428 |
| 1998 | 833.04 | 607 | 648 | 185 | 5.97 | 31 |
| 2000 | 1,765.00 | 1,175 | 1,254 | 511 | 7.36 | 69 |
| 2003 | 15,820.86 | 8,773 | 9,364 | 6,457 | 9.80 | 659 |
| 2004 | 3,754.50 | 1,932 | 2,062 | 1,692 | 10.68 | 158 |
| 2005 | 27,658.30 | 13,075 | 13,956 | 13,702 | 11.60 | 1,181 |
| 2006 | 21,750.00 | 9,343 | 9,972 | 11,778 | 12.55 | 938 |
| 2012 | 79,242.94 | 12,607 | 13,456 | 65,787 | 18.50 | 3,556 |
| | 262,853.45 | 135,232 | 144,342 | 118,512 | | 10,414 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 11.4 3.96

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M10 - MISCELLANEOUS UNITS OF PROPERTY

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 22-R1.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1970 | 6,185.00 | 6,185 | 6,185 | | | |
| 1985 | 315,254.84 | 259,943 | 315,255 | | | |
| 1989 | 795,281.80 | 607,667 | 795,282 | | | |
| 1990 | 825,974.72 | 616,854 | 825,975 | | | |
| 1991 | 50,436.68 | 36,750 | 50,437 | | | |
| 2004 | 15,584.21 | 6,212 | 11,257 | 4,327 | 13.23 | 327 |
| 2007 | 17,122.85 | 5,160 | 9,351 | 7,772 | 15.37 | 506 |
| 2010 | 20,438,077.12 | 4,069,017 | 7,373,837 | 13,064,240 | 17.62 | 741,444 |
| 2011 | 1,339,679.15 | 219,828 | 398,370 | 941,309 | 18.39 | 51,186 |
| 2013 | 1,581,834.50 | 145,956 | 264,501 | 1,317,334 | 19.97 | 65,966 |
| 2014 | 110,378.30 | 6,171 | 11,183 | 99,195 | 20.77 | 4,776 |
| 2015 | 320,146.61 | 11,909 | 21,581 | 298,566 | 12.96 | 23,038 |
| | 25,815,955.78 | 5,991,652 | 10,083,214 | 15,732,742 | | 887,243 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 17.7 3.44

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M11 - MOBILE - A.T.V.'S AND SNOWMOBILES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 6-L3 | | | | | | |
| NET SALVAGE PERCENT.. +20 | | | | | | |
| 2007 | 46,853.00 | 29,611 | 37,482 | | | |
| 2008 | 72,292.00 | 43,279 | 57,834 | | | |
| 2009 | 156,935.00 | 89,557 | 125,548 | | | |
| 2010 | 91,663.35 | 50,232 | 73,331 | | | |
| 2011 | 156,948.00 | 79,730 | 123,955 | 1,603 | 2.19 | 732 |
| 2012 | 83,583.00 | 35,996 | 55,962 | 10,904 | 2.77 | 3,936 |
| 2013 | 803,692.66 | 259,323 | 403,166 | 239,788 | 3.58 | 66,980 |
| 2014 | 279,015.41 | 55,430 | 86,176 | 137,036 | 4.51 | 30,385 |
| 2015 | 215,756.83 | 16,328 | 25,385 | 147,220 | 4.78 | 30,799 |
| | 1,906,739.25 | 659,486 | 988,839 | 536,552 | | 132,832 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 4.0 6.97

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M12 - MOBILE - AIR COMPRESSOR ATTACHMENT AND BOAT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 20-L0 | | | | | | |
| NET SALVAGE PERCENT.. +20 | | | | | | |
| 1979 | 87,567.04 | 44,064 | 70,054 | | | |
| 1980 | 0.01 | | | | | |
| 1981 | 3,430.57 | 1,669 | 2,744 | | | |
| 1986 | 15,409.87 | 6,799 | 12,328 | | | |
| 1988 | 32,750.14 | 13,821 | 26,200 | | | |
| 1989 | 25,669.08 | 10,576 | 20,535 | | | |
| 1993 | 13,484.38 | 4,978 | 10,788 | | | |
| 1994 | 4,062.24 | 1,454 | 3,250 | | | |
| 1996 | 11,982.66 | 4,007 | 9,586 | | | |
| 1997 | 12,900.00 | 4,159 | 10,320 | | | |
| 1998 | 2,375.00 | 736 | 1,900 | | | |
| 1999 | 31,217.74 | 9,278 | 24,974 | | | |
| 2000 | 17,995.00 | 5,118 | 14,396 | | | |
| 2006 | 12,599.00 | 2,500 | 10,079 | | | |
| 2009 | 77,874.00 | 11,650 | 59,636 | 2,663 | 16.26 | 164 |
| 2010 | 22,689.00 | 2,986 | 15,285 | 2,866 | 16.71 | 172 |
| 2011 | 24,400.00 | 2,743 | 14,041 | 5,479 | 17.19 | 319 |
| 2012 | 35,640.00 | 3,265 | 16,713 | 11,799 | 17.71 | 666 |
| | 432,045.73 | 129,803 | 322,829 | 22,807 | | 1,321 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 17.3 0.31

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M13 - MOBILE - ARGO'S

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 9-R5 | | | | | | |
| NET SALVAGE PERCENT.. +20 | | | | | | |
| 2010 | 117,000.00 | 56,992 | 93,600 | | | |
| 2011 | 22,239.69 | 8,896 | 17,792 | | | |
| 2012 | 59,494.00 | 18,509 | 47,595 | | | |
| 2013 | 88,553.28 | 19,679 | 111,081 | 40,239- | | |
| | 287,286.97 | 104,076 | 270,068 | 40,239- | | |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 0.0 0.00

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M14 - MOBILE - FLEX/FORK/LOAD/GRADE/MUSK/TRAILER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 18-L3 | | | | | | |
| NET SALVAGE PERCENT.. +20 | | | | | | |
| 1981 | 42,744.83 | 31,042 | 34,196 | | | |
| 1982 | 10,643.83 | 7,630 | 8,515 | | | |
| 1984 | 13,077.69 | 9,120 | 10,462 | | | |
| 1988 | 134,706.88 | 88,307 | 107,766 | | | |
| 1989 | 86,197.29 | 55,511 | 68,958 | | | |
| 1990 | 43,680.00 | 27,625 | 34,944 | | | |
| 1992 | 145,304.06 | 88,603 | 116,243 | | | |
| 1993 | 36,994.60 | 22,147 | 29,596 | | | |
| 1995 | 30,432.96 | 17,624 | 24,346 | | | |
| 1998 | 371,250.63 | 206,415 | 297,001 | | | |
| 1999 | 283,809.60 | 155,401 | 227,048 | | | |
| 2000 | 222,125.00 | 119,356 | 177,700 | | | |
| 2001 | 282,760.01 | 148,293 | 225,349 | 859 | 6.20 | 139 |
| 2002 | 179,687.00 | 91,200 | 138,590 | 5,160 | 6.58 | 784 |
| 2003 | 15,997.87 | 7,779 | 11,821 | 977 | 7.06 | 138 |
| 2004 | 136,636.50 | 62,914 | 95,606 | 13,703 | 7.64 | 1,794 |
| 2005 | 328,255.24 | 141,368 | 214,826 | 47,778 | 8.31 | 5,749 |
| 2006 | 622,272.69 | 246,973 | 375,306 | 122,512 | 9.07 | 13,507 |
| 2007 | 396,251.24 | 142,828 | 217,045 | 99,956 | 9.89 | 10,107 |
| 2008 | 1,164,855.27 | 375,344 | 570,381 | 361,503 | 10.75 | 33,628 |
| 2009 | 851,566.55 | 240,333 | 365,216 | 316,037 | 11.65 | 27,128 |
| 2010 | 352,166.32 | 84,833 | 128,914 | 152,819 | 12.58 | 12,148 |
| 2011 | 1,777,190.38 | 353,064 | 536,524 | 885,228 | 13.53 | 65,427 |
| 2012 | 819,248.40 | 127,075 | 193,106 | 462,293 | 14.51 | 31,860 |
| 2013 | 363,231.41 | 40,359 | 61,330 | 229,255 | 15.50 | 14,791 |
| 2014 | 1,486,091.26 | 99,069 | 150,548 | 1,038,325 | 16.50 | 62,929 |
| 2015 | 384,134.71 | 9,649 | 14,663 | 292,645 | 15.40 | 19,003 |
| | 10,581,312.22 | 2,999,862 | 4,436,000 | 4,029,050 | | 299,132 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 13.5 2.83

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M16 - MULTIPLEX EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 18-S1.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1980 | 72,014.91 | 71,455 | 72,015 | | | |
| 1999 | 37,192.70 | 25,229 | 37,193 | | | |
| 2000 | 108,463.34 | 70,862 | 108,463 | | | |
| 2001 | 736,804.61 | 461,733 | 718,722 | 18,083 | 6.72 | 2,691 |
| 2002 | 353,971.09 | 211,597 | 329,367 | 24,604 | 7.24 | 3,398 |
| 2003 | 609,578.15 | 345,765 | 538,209 | 71,369 | 7.79 | 9,162 |
| 2004 | 4,819.61 | 2,578 | 4,013 | 807 | 8.37 | 96 |
| 2005 | 62,819.85 | 31,410 | 48,892 | 13,928 | 9.00 | 1,548 |
| 2008 | 138,997.61 | 52,973 | 82,456 | 56,542 | 11.14 | 5,076 |
| 2010 | 495,304.03 | 143,638 | 223,584 | 271,720 | 12.78 | 21,261 |
| 2011 | 12,028.86 | 2,900 | 4,514 | 7,515 | 13.66 | 550 |
| 2012 | 180,222.11 | 34,242 | 53,300 | 126,922 | 14.58 | 8,705 |
| | 2,812,216.87 | 1,454,382 | 2,220,728 | 591,489 | | 52,487 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 11.3 1.87

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT O01 - OFFICE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 20-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1996 | 16,183.45 | 15,779 | 16,183 | | | |
| 1997 | 66,014.61 | 61,064 | 66,015 | | | |
| 1998 | 3,480.00 | 3,045 | 3,480 | | | |
| 1999 | 54,164.38 | 44,686 | 54,164 | | | |
| 2000 | 48,627.79 | 37,687 | 48,628 | | | |
| 2001 | 24,963.81 | 18,099 | 24,964 | | | |
| 2002 | 21,822.24 | 14,730 | 21,790 | 32 | 6.50 | 5 |
| 2003 | 37,899.07 | 23,687 | 35,040 | 2,859 | 7.50 | 381 |
| 2004 | 32,921.94 | 18,930 | 28,003 | 4,919 | 8.50 | 579 |
| 2005 | 9,608.92 | 5,045 | 7,463 | 2,146 | 9.50 | 226 |
| 2006 | 77,147.66 | 36,645 | 54,209 | 22,939 | 10.50 | 2,185 |
| 2007 | 23,654.54 | 10,053 | 14,872 | 8,783 | 11.50 | 764 |
| 2008 | 134,350.49 | 50,381 | 74,529 | 59,821 | 12.50 | 4,786 |
| 2009 | 48,737.86 | 15,840 | 23,432 | 25,306 | 13.50 | 1,875 |
| 2010 | 280,792.29 | 77,218 | 114,229 | 166,563 | 14.50 | 11,487 |
| 2011 | 117,705.69 | 26,484 | 39,178 | 78,528 | 15.50 | 5,066 |
| 2012 | 65,898.39 | 11,532 | 17,060 | 48,838 | 16.50 | 2,960 |
| 2013 | 47,195.96 | 5,899 | 8,726 | 38,470 | 17.50 | 2,198 |
| 2014 | 169,148.66 | 12,686 | 18,767 | 150,382 | 18.50 | 8,129 |
| 2015 | 6,121.97 | 153 | 226 | 5,896 | 19.50 | 302 |
| | 1,286,439.72 | 489,643 | 670,958 | 615,481 | | 40,943 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 15.0 3.18

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT 002 - OFFICE FURNITURE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 20-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1996 | 29,219.24 | 28,489 | 29,219 | | | |
| 1997 | 36,590.65 | 33,846 | 36,591 | | | |
| 1998 | 79,197.16 | 69,298 | 79,197 | | | |
| 1999 | 80,433.08 | 66,357 | 80,433 | | | |
| 2000 | 211,310.15 | 163,765 | 204,954 | 6,356 | 4.50 | 1,412 |
| 2001 | 22,901.71 | 16,604 | 20,780 | 2,122 | 5.50 | 386 |
| 2002 | 29,959.88 | 20,223 | 25,309 | 4,651 | 6.50 | 716 |
| 2003 | 16,175.45 | 10,110 | 12,653 | 3,522 | 7.50 | 470 |
| 2004 | 7,439.05 | 4,277 | 5,353 | 2,086 | 8.50 | 245 |
| 2005 | 85,208.45 | 44,734 | 55,985 | 29,223 | 9.50 | 3,076 |
| 2006 | 119,900.15 | 56,953 | 71,278 | 48,622 | 10.50 | 4,631 |
| 2007 | 59,862.92 | 25,442 | 31,841 | 28,022 | 11.50 | 2,437 |
| 2008 | 85,940.49 | 32,228 | 40,334 | 45,606 | 12.50 | 3,648 |
| 2009 | 130,101.60 | 42,283 | 52,918 | 77,184 | 13.50 | 5,717 |
| 2010 | 194,647.39 | 53,528 | 66,991 | 127,656 | 14.50 | 8,804 |
| 2011 | 84,517.24 | 19,016 | 23,799 | 60,718 | 15.50 | 3,917 |
| 2012 | 90,136.68 | 15,774 | 19,741 | 70,396 | 16.50 | 4,266 |
| 2013 | 24,491.46 | 3,061 | 3,831 | 20,660 | 17.50 | 1,181 |
| 2014 | 36,046.62 | 2,703 | 3,383 | 32,664 | 18.50 | 1,766 |
| 2015 | 53,910.54 | 1,348 | 1,687 | 52,224 | 19.50 | 2,678 |
| | 1,477,989.91 | 710,039 | 866,277 | 611,713 | | 45,350 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 13.5 3.07

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P01 - P.C.B. STORAGE CONTAINER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 30-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1991 | 42,479.84 | 31,605 | 41,427 | 1,052 | 7.68 | 137 |
| | 42,479.84 | 31,605 | 41,427 | 1,052 | | 137 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 7.7 | 0.32 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P02 - PABX - PRIVATE AUTO BRANCH EXCHANGE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 20-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1998 | 37,491.90 | 29,356 | 37,492 | | | |
| 2000 | 258,657.30 | 184,811 | 258,657 | | | |
| 2003 | 84,331.38 | 50,388 | 78,648 | 5,683 | 8.05 | 706 |
| 2006 | 800,527.97 | 372,246 | 581,020 | 219,508 | 10.70 | 20,515 |
| | 1,181,008.55 | 636,801 | 955,817 | 225,191 | | 21,221 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 10.6 | | | | | | 1.80 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P03 - PENSTOCK

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 70-R4 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1966 | 13,597,173.00 | 9,744,490 | 5,227,231 | 9,457,716 | 23.55 | 401,602 |
| 1967 | 6,972,000.00 | 4,912,641 | 2,635,285 | 4,894,475 | 24.33 | 201,170 |
| 1970 | 351,355.39 | 234,509 | 125,798 | 253,666 | 26.74 | 9,486 |
| 1979 | 11,030,667.78 | 6,045,075 | 3,242,756 | 8,670,365 | 34.48 | 251,461 |
| 1982 | 12,972,402.67 | 6,560,834 | 3,519,425 | 10,490,770 | 37.22 | 281,858 |
| 1985 | 4,690,571.00 | 2,170,348 | 1,164,239 | 3,901,578 | 40.01 | 97,515 |
| 1989 | 414,557.06 | 167,511 | 89,858 | 357,864 | 43.81 | 8,169 |
| 2003 | 6,732,225.16 | 1,294,203 | 694,248 | 6,576,555 | 57.54 | 114,295 |
| 2006 | 2,147,468.60 | 314,098 | 168,492 | 2,150,774 | 60.52 | 35,538 |
| | 58,908,420.66 | 31,443,709 | 16,867,332 | 46,753,763 | | 1,401,094 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 33.4 2.38

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P04 - POLE CRIBS AND POLE HARDWARE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 35-S2.5 | | | | | | |
| NET SALVAGE PERCENT.. -20 | | | | | | |
| 1968 | 1,845.17 | 1,943 | 1,842 | 372 | 4.29 | 87 |
| 1970 | 77,086.69 | 79,950 | 75,808 | 16,696 | 4.75 | 3,515 |
| 1978 | 11,761.12 | 11,291 | 10,706 | 3,407 | 7.00 | 487 |
| 1979 | 1,413.56 | 1,341 | 1,272 | 424 | 7.34 | 58 |
| 1981 | 3,061,318.96 | 2,824,471 | 2,678,127 | 995,456 | 8.09 | 123,048 |
| 1982 | 1,428,282.57 | 1,298,669 | 1,231,381 | 482,558 | 8.48 | 56,905 |
| 1983 | 727,698.47 | 651,182 | 617,442 | 255,796 | 8.90 | 28,741 |
| 1984 | 896,385.01 | 788,611 | 747,751 | 327,911 | 9.34 | 35,108 |
| 1985 | 736,521.61 | 636,098 | 603,140 | 280,686 | 9.81 | 28,612 |
| 1986 | 1,193,610.51 | 1,010,811 | 958,438 | 473,895 | 10.30 | 46,009 |
| 1987 | 2,151,281.92 | 1,784,204 | 1,691,759 | 889,779 | 10.81 | 82,311 |
| 1988 | 1,154,830.63 | 936,397 | 887,880 | 497,917 | 11.35 | 43,869 |
| 1989 | 1,696,041.19 | 1,342,105 | 1,272,567 | 762,682 | 11.92 | 63,983 |
| 1990 | 1,761,660.55 | 1,358,388 | 1,288,006 | 825,987 | 12.51 | 66,026 |
| 1991 | 1,767,156.41 | 1,325,070 | 1,256,414 | 864,174 | 13.13 | 65,817 |
| 1992 | 1,095,693.13 | 797,169 | 755,865 | 558,967 | 13.78 | 40,564 |
| 1993 | 1,292,032.25 | 909,890 | 862,746 | 687,693 | 14.46 | 47,558 |
| 1994 | 1,579,697.47 | 1,074,011 | 1,018,363 | 877,274 | 15.17 | 57,830 |
| 1995 | 1,861,510.71 | 1,218,389 | 1,155,261 | 1,078,552 | 15.91 | 67,791 |
| 1996 | 2,633,416.42 | 1,654,976 | 1,569,227 | 1,590,873 | 16.67 | 95,433 |
| 1997 | 4,885,285.29 | 2,937,854 | 2,785,635 | 3,076,707 | 17.46 | 176,215 |
| 1998 | 1,878,680.76 | 1,076,958 | 1,021,158 | 1,233,259 | 18.28 | 67,465 |
| 1999 | 1,372,514.80 | 747,268 | 708,550 | 938,468 | 19.12 | 49,083 |
| 2000 | 2,050,387.44 | 1,055,195 | 1,000,522 | 1,459,943 | 19.99 | 73,034 |
| 2001 | 2,399,127.49 | 1,161,456 | 1,101,278 | 1,777,675 | 20.88 | 85,138 |
| 2002 | 4,734,632.00 | 2,145,981 | 2,034,792 | 3,646,766 | 21.78 | 167,436 |
| 2003 | 3,265,505.84 | 1,375,980 | 1,304,687 | 2,613,920 | 22.71 | 115,100 |
| 2004 | 3,602,858.68 | 1,402,045 | 1,329,401 | 2,994,029 | 23.65 | 126,597 |
| 2005 | 3,462,816.60 | 1,234,730 | 1,170,755 | 2,984,625 | 24.60 | 121,326 |
| 2006 | 4,537,133.14 | 1,466,928 | 1,390,922 | 4,053,638 | 25.57 | 158,531 |
| 2007 | 3,973,884.13 | 1,152,633 | 1,092,912 | 3,675,749 | 26.54 | 138,498 |
| 2008 | 5,702,540.68 | 1,460,512 | 1,384,839 | 5,458,210 | 27.53 | 198,264 |
| 2009 | 5,642,349.74 | 1,255,513 | 1,190,461 | 5,580,359 | 28.51 | 195,733 |
| 2010 | 5,042,753.64 | 949,208 | 900,027 | 5,151,277 | 29.51 | 174,560 |
| 2011 | 7,085,136.89 | 1,093,123 | 1,036,485 | 7,465,679 | 30.50 | 244,776 |
| 2012 | 7,655,567.91 | 918,668 | 871,069 | 8,315,612 | 31.50 | 263,988 |
| 2013 | 15,939,566.56 | 1,366,276 | 1,295,485 | 17,831,995 | 32.50 | 548,677 |
| 2014 | 1,880,919.80 | 96,739 | 91,727 | 2,165,377 | 33.50 | 64,638 |
| 2015 | 8,130,250.53 | 154,150 | 146,163 | 9,610,137 | 31.24 | 307,623 |
| | 118,371,156.27 | 42,756,183 | 40,540,863 | 101,504,524 | | 4,230,434 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 24.0 3.57

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P05 - POLE STRUCTURES - WOOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 57-R3 | | | | | | |
| NET SALVAGE PERCENT.. -20 | | | | | | |
| 1967 | 1,368,472.29 | 1,178,616 | 1,053,667 | 588,500 | 16.09 | 36,576 |
| 1968 | 686,797.97 | 582,696 | 520,922 | 303,236 | 16.70 | 18,158 |
| 1969 | 420,665.37 | 351,320 | 314,075 | 190,723 | 17.33 | 11,005 |
| 1970 | 2,780,493.34 | 2,284,698 | 2,042,489 | 1,294,103 | 17.97 | 72,015 |
| 1971 | 20,688.28 | 16,712 | 14,940 | 9,886 | 18.63 | 531 |
| 1974 | 2,809,521.88 | 2,148,846 | 1,921,039 | 1,450,387 | 20.67 | 70,169 |
| 1975 | 4,543.00 | 3,407 | 3,046 | 2,406 | 21.38 | 113 |
| 1976 | 111,728.97 | 82,091 | 73,388 | 60,687 | 22.10 | 2,746 |
| 1977 | 289,602.19 | 208,329 | 186,243 | 161,280 | 22.83 | 7,064 |
| 1978 | 5,599,369.39 | 3,940,769 | 3,522,994 | 3,196,249 | 23.57 | 135,607 |
| 1979 | 3,913.00 | 2,693 | 2,408 | 2,288 | 24.31 | 94 |
| 1980 | 867,615.85 | 583,225 | 521,395 | 519,744 | 25.07 | 20,732 |
| 1981 | 6,018,792.76 | 3,948,352 | 3,529,773 | 3,692,778 | 25.84 | 142,909 |
| 1982 | 6,850,067.63 | 4,381,139 | 3,916,679 | 4,303,402 | 26.62 | 161,660 |
| 1983 | 5,788,514.54 | 3,605,920 | 3,223,644 | 3,722,573 | 27.41 | 135,811 |
| 1984 | 443,026.83 | 268,522 | 240,055 | 291,577 | 28.21 | 10,336 |
| 1985 | 2,041,402.54 | 1,202,500 | 1,075,019 | 1,374,664 | 29.02 | 47,370 |
| 1986 | 169,584.93 | 96,967 | 86,687 | 116,815 | 29.84 | 3,915 |
| 1987 | 4,807,814.12 | 2,666,087 | 2,383,446 | 3,385,931 | 30.66 | 110,435 |
| 1988 | 2,640,192.35 | 1,417,371 | 1,267,111 | 1,901,120 | 31.50 | 60,353 |
| 1989 | 585,499.62 | 303,966 | 271,742 | 430,858 | 32.34 | 13,323 |
| 1990 | 23,934,682.00 | 11,997,594 | 10,725,687 | 17,995,931 | 33.19 | 542,209 |
| 1991 | 223,252.59 | 107,866 | 96,431 | 171,472 | 34.05 | 5,036 |
| 1992 | 143,107.01 | 66,522 | 59,470 | 112,258 | 34.92 | 3,215 |
| 1993 | 127,323.81 | 56,854 | 50,827 | 101,962 | 35.79 | 2,849 |
| 1994 | 115,719.28 | 49,528 | 44,277 | 94,586 | 36.67 | 2,579 |
| 1995 | 3,027,560.94 | 1,239,060 | 1,107,703 | 2,525,370 | 37.56 | 67,236 |
| 1996 | 6,014,190.95 | 2,347,411 | 2,098,554 | 5,118,475 | 38.46 | 133,086 |
| 1997 | 284,490.40 | 105,649 | 94,449 | 246,939 | 39.36 | 6,274 |
| 1998 | 3,247,147.94 | 1,143,684 | 1,022,438 | 2,874,140 | 40.27 | 71,372 |
| 1999 | 81,830.77 | 27,237 | 24,350 | 73,847 | 41.19 | 1,793 |
| 2000 | 6,781,138.74 | 2,125,724 | 1,900,368 | 6,236,998 | 42.11 | 148,112 |
| 2001 | 4,203,315.22 | 1,235,321 | 1,104,360 | 3,939,618 | 43.04 | 91,534 |
| 2002 | 1,106,847.87 | 303,631 | 271,442 | 1,056,775 | 43.97 | 24,034 |
| 2003 | 4,285,684.52 | 1,090,844 | 975,200 | 4,167,621 | 44.91 | 92,799 |
| 2004 | 455,122.20 | 106,739 | 95,423 | 450,724 | 45.86 | 9,828 |
| 2005 | 2,515,578.70 | 539,652 | 482,442 | 2,536,252 | 46.81 | 54,182 |
| 2006 | 4,551,912.00 | 885,493 | 791,619 | 4,670,675 | 47.76 | 97,795 |
| 2007 | 487,546.53 | 84,985 | 75,975 | 509,081 | 48.72 | 10,449 |
| 2008 | 2,858,815.26 | 440,555 | 393,850 | 3,036,728 | 49.68 | 61,126 |
| 2009 | 3,045,510.63 | 407,124 | 363,963 | 3,290,650 | 50.65 | 64,968 |
| 2010 | 591,671.63 | 67,017 | 59,912 | 650,094 | 51.62 | 12,594 |
| 2011 | 3,723,983.33 | 345,750 | 309,096 | 4,159,684 | 52.59 | 79,096 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P05 - POLE STRUCTURES - WOOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 57-R3 | | | | | | |
| NET SALVAGE PERCENT.. -20 | | | | | | |
| 2012 | 2,562,848.59 | 185,079 | 165,458 | 2,909,960 | 53.57 | 54,321 |
| 2013 | 2,491,211.49 | 129,025 | 115,347 | 2,874,107 | 54.54 | 52,697 |
| 2014 | 4,784,879.85 | 149,059 | 133,257 | 5,608,599 | 55.52 | 101,019 |
| 2015 | 3,836,606.31 | 47,881 | 42,805 | 4,561,123 | 47.58 | 95,862 |
| | 129,790,285.41 | 54,559,510 | 48,775,465 | 106,972,878 | | 2,946,987 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 36.3 | 2.27 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P06 - POLES - CONCRETE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 25-R4 | | | | | | |
| NET SALVAGE PERCENT.. -20 | | | | | | |
| 1981 | 23,208.03 | 26,992 | 25,031 | 2,819 | 0.77 | 2,819 |
| 1982 | 72,462.60 | 83,442 | 77,380 | 9,575 | 1.01 | 9,480 |
| 1984 | 58,940.77 | 66,457 | 61,629 | 9,100 | 1.51 | 6,026 |
| 1986 | 69,138.28 | 76,130 | 70,599 | 12,367 | 2.06 | 6,003 |
| 1987 | 10,316.62 | 11,216 | 10,401 | 1,979 | 2.35 | 842 |
| 1990 | 23,134.24 | 23,952 | 22,212 | 5,549 | 3.43 | 1,618 |
| 1994 | 34,476.00 | 31,988 | 29,665 | 11,706 | 5.67 | 2,065 |
| 1997 | 1,639.61 | 1,354 | 1,256 | 712 | 7.79 | 91 |
| 1999 | 571.34 | 429 | 398 | 288 | 9.35 | 31 |
| 2005 | 15,775.50 | 7,830 | 7,261 | 11,670 | 14.66 | 796 |
| 2014 | 24,097.27 | 1,735 | 1,608 | 27,308 | 23.50 | 1,162 |
| | 333,760.26 | 331,525 | 307,440 | 93,072 | | 30,933 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 3.0 9.27

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P07 - POLES - WOOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 43-R1 | | | | | | |
| NET SALVAGE PERCENT.. -20 | | | | | | |
| 1968 | 1,429.92 | 1,170 | 1,716 | | | |
| 1970 | 17,408.79 | 13,798 | 20,891 | | | |
| 1978 | 2,920.56 | 1,989 | 3,438 | 67 | 18.59 | 4 |
| 1979 | 287.20 | 191 | 330 | 15 | 19.12 | 1 |
| 1981 | 1,553,445.95 | 987,992 | 1,707,915 | 156,220 | 20.21 | 7,730 |
| 1982 | 486,800.75 | 302,000 | 522,059 | 62,102 | 20.77 | 2,990 |
| 1983 | 348,061.32 | 210,391 | 363,697 | 53,977 | 21.34 | 2,529 |
| 1984 | 430,502.34 | 253,378 | 438,008 | 78,595 | 21.91 | 3,587 |
| 1985 | 131,555.88 | 75,262 | 130,103 | 27,764 | 22.50 | 1,234 |
| 1986 | 901,692.63 | 501,002 | 866,069 | 215,962 | 23.09 | 9,353 |
| 1987 | 1,101,007.77 | 593,619 | 1,026,173 | 295,036 | 23.68 | 12,459 |
| 1988 | 943,974.25 | 492,890 | 852,046 | 280,723 | 24.29 | 11,557 |
| 1989 | 1,606,604.49 | 811,522 | 1,402,857 | 525,068 | 24.90 | 21,087 |
| 1990 | 1,001,598.39 | 488,592 | 844,616 | 357,302 | 25.52 | 14,001 |
| 1991 | 829,595.79 | 390,102 | 674,359 | 321,156 | 26.15 | 12,281 |
| 1992 | 757,385.96 | 342,832 | 592,645 | 316,218 | 26.78 | 11,808 |
| 1993 | 952,488.78 | 414,138 | 715,909 | 427,078 | 27.42 | 15,575 |
| 1994 | 1,338,365.33 | 557,633 | 963,965 | 642,073 | 28.07 | 22,874 |
| 1995 | 951,666.66 | 379,247 | 655,594 | 486,406 | 28.72 | 16,936 |
| 1996 | 1,577,293.90 | 599,965 | 1,037,144 | 855,609 | 29.37 | 29,132 |
| 1997 | 1,948,899.80 | 705,416 | 1,219,434 | 1,119,246 | 30.03 | 37,271 |
| 1998 | 1,152,928.92 | 395,754 | 684,129 | 699,386 | 30.70 | 22,781 |
| 1999 | 951,172.04 | 308,716 | 533,669 | 607,737 | 31.37 | 19,373 |
| 2000 | 1,146,005.31 | 350,513 | 605,923 | 769,283 | 32.04 | 24,010 |
| 2001 | 1,271,276.81 | 364,709 | 630,463 | 895,069 | 32.72 | 27,355 |
| 2002 | 6,273,454.43 | 1,680,734 | 2,905,440 | 4,622,705 | 33.40 | 138,404 |
| 2003 | 1,513,912.45 | 376,437 | 650,737 | 1,165,958 | 34.09 | 34,202 |
| 2004 | 1,430,524.60 | 328,151 | 567,266 | 1,149,364 | 34.78 | 33,047 |
| 2005 | 1,946,928.17 | 409,135 | 707,261 | 1,629,053 | 35.47 | 45,928 |
| 2006 | 4,237,066.54 | 808,788 | 1,398,130 | 3,686,350 | 36.16 | 101,946 |
| 2007 | 2,043,174.40 | 350,094 | 605,198 | 1,846,611 | 36.86 | 50,098 |
| 2008 | 1,910,171.40 | 289,460 | 500,382 | 1,791,824 | 37.57 | 47,693 |
| 2009 | 1,439,822.76 | 189,659 | 327,858 | 1,399,929 | 38.28 | 36,571 |
| 2010 | 6,400,391.33 | 716,281 | 1,238,216 | 6,442,254 | 38.99 | 165,228 |
| 2011 | 2,459,336.59 | 225,797 | 390,329 | 2,560,875 | 39.71 | 64,489 |
| 2012 | 3,783,242.36 | 271,349 | 469,074 | 4,070,817 | 40.43 | 100,688 |
| 2013 | 4,806,162.69 | 246,787 | 426,614 | 5,340,781 | 41.16 | 129,757 |
| 2014 | 4,724,196.35 | 146,318 | 252,936 | 5,416,100 | 41.89 | 129,293 |
| 2015 | 8,231,876.13 | 231,151 | 399,585 | 9,478,667 | 20.87 | 454,177 |
| | 72,604,629.74 | 15,812,962 | 27,332,178 | 59,793,378 | | 1,857,449 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 32.2 2.56

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P08 - POWER LINE CARRIER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 25-R3 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1978 | 50,794.89 | 51,366 | 53,843 | | | |
| 1980 | 901,642.38 | 892,280 | 955,741 | | | |
| 1982 | 10,151.14 | 9,826 | 10,760 | | | |
| 1990 | 1,997.13 | 1,710 | 2,117 | | | |
| 1995 | 319,668.37 | 236,787 | 338,848 | | | |
| 1996 | 115,824.11 | 82,602 | 122,774 | | | |
| 1999 | 532,472.13 | 331,879 | 525,099 | 39,321 | 10.30 | 3,818 |
| 2000 | 1,168,541.93 | 691,169 | 1,093,568 | 145,086 | 11.05 | 13,130 |
| 2002 | 594,654.98 | 311,889 | 493,471 | 136,863 | 12.63 | 10,836 |
| 2003 | 258,180.09 | 126,436 | 200,047 | 73,624 | 13.45 | 5,474 |
| 2004 | 287,074.34 | 130,362 | 206,259 | 98,040 | 14.29 | 6,861 |
| 2008 | 368,553.14 | 112,199 | 177,521 | 213,145 | 17.82 | 11,961 |
| 2009 | 351,267.78 | 93,086 | 147,281 | 225,063 | 18.75 | 12,003 |
| 2012 | 10,750.00 | 1,554 | 2,459 | 8,936 | 21.59 | 414 |
| | 4,971,572.41 | 3,073,145 | 4,329,788 | 940,079 | | 64,497 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 14.6 1.30

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P09 - POWER SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 20-L3 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1980 | 3,939.62 | 3,664 | 3,591 | 585 | 2.45 | 239 |
| 1990 | 3,702.71 | 2,961 | 2,902 | 1,023 | 4.91 | 208 |
| 1992 | 2,349.84 | 1,822 | 1,786 | 705 | 5.37 | 131 |
| 1997 | 29,300.16 | 21,321 | 20,895 | 10,163 | 6.27 | 1,621 |
| 1998 | 2,672.81 | 1,914 | 1,876 | 957 | 6.49 | 147 |
| 1999 | 4,402.88 | 3,087 | 3,025 | 1,642 | 6.77 | 243 |
| 2000 | 7,428.22 | 5,075 | 4,974 | 2,900 | 7.11 | 408 |
| 2003 | 374,436.07 | 224,845 | 220,349 | 176,553 | 8.67 | 20,364 |
| 2004 | 29,433.83 | 16,598 | 16,266 | 14,934 | 9.36 | 1,596 |
| 2006 | 96,294.52 | 46,239 | 45,314 | 56,758 | 10.94 | 5,188 |
| 2007 | 1,087.65 | 473 | 464 | 689 | 11.80 | 58 |
| 2008 | 24,903.99 | 9,649 | 9,456 | 16,942 | 12.69 | 1,335 |
| 2012 | 23,109.92 | 4,275 | 4,189 | 20,308 | 16.51 | 1,230 |
| 2013 | 47,739.50 | 6,325 | 6,199 | 44,405 | 17.50 | 2,537 |
| 2014 | 13,790.40 | 1,096 | 1,074 | 13,544 | 18.50 | 732 |
| | 664,592.12 | 349,344 | 342,360 | 362,108 | | 36,037 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 10.0 5.42

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P10 - POWERHOUSE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 75-R3 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1966 | 6,311,169.11 | 4,008,731 | 2,148,243 | 4,667,820 | 30.89 | 151,111 |
| 1967 | 4,570,325.24 | 2,853,622 | 1,529,230 | 3,406,721 | 31.64 | 107,671 |
| 1969 | 2,852,512.87 | 1,719,038 | 921,217 | 2,159,497 | 33.15 | 65,143 |
| 1970 | 2,813,125.00 | 1,664,100 | 891,776 | 2,146,399 | 33.92 | 63,278 |
| 1971 | 3,591,077.62 | 2,083,961 | 1,116,776 | 2,761,588 | 34.70 | 79,585 |
| 1976 | 5,000.00 | 2,614 | 1,401 | 3,999 | 38.70 | 103 |
| 1978 | 1,083,475.00 | 540,763 | 289,790 | 880,363 | 40.34 | 21,824 |
| 1979 | 6,557,377.81 | 3,193,472 | 1,711,353 | 5,370,615 | 41.18 | 130,418 |
| 1980 | 2,154,843.14 | 1,023,353 | 548,406 | 1,778,825 | 42.02 | 42,333 |
| 1981 | 242,625.77 | 112,290 | 60,175 | 201,861 | 42.86 | 4,710 |
| 1982 | 12,555,601.74 | 5,655,490 | 3,030,726 | 10,529,324 | 43.72 | 240,835 |
| 1983 | 4,570,723.64 | 2,002,838 | 1,073,303 | 3,863,079 | 44.57 | 86,674 |
| 1984 | 11,985,754.79 | 5,101,861 | 2,734,042 | 10,210,573 | 45.44 | 224,705 |
| 1985 | 6,005,216.38 | 2,480,949 | 1,329,518 | 5,156,116 | 46.31 | 111,339 |
| 1986 | 10,005.17 | 4,008 | 2,148 | 8,658 | 47.18 | 184 |
| 1987 | 219,450.45 | 85,102 | 45,605 | 191,401 | 48.07 | 3,982 |
| 1988 | 1,492,250.75 | 559,768 | 299,975 | 1,311,656 | 48.95 | 26,796 |
| 1989 | 1,071,438.20 | 388,028 | 207,941 | 949,212 | 49.85 | 19,041 |
| 1990 | 38,861.82 | 13,576 | 7,275 | 34,696 | 50.74 | 684 |
| 1991 | 10,918.56 | 3,671 | 1,967 | 9,825 | 51.65 | 190 |
| 1993 | 2,707,655.42 | 839,470 | 449,864 | 2,474,404 | 53.47 | 46,276 |
| 1994 | 44,880.61 | 13,320 | 7,138 | 41,333 | 54.39 | 760 |
| 1995 | 148,263.24 | 42,037 | 22,527 | 137,597 | 55.31 | 2,488 |
| 1997 | 7,274.98 | 1,868 | 1,001 | 6,856 | 57.17 | 120 |
| 1998 | 9,563.03 | 2,326 | 1,246 | 9,082 | 58.11 | 156 |
| 2000 | 107,638.74 | 23,265 | 12,468 | 103,782 | 59.99 | 1,730 |
| 2003 | 20,849,611.08 | 3,650,775 | 1,956,419 | 20,561,161 | 62.84 | 327,199 |
| 2006 | 83,289.00 | 11,118 | 5,958 | 83,994 | 65.73 | 1,278 |
| 2008 | 110,785.58 | 11,710 | 6,275 | 113,373 | 67.66 | 1,676 |
| 2013 | 136,303.49 | 4,828 | 2,587 | 144,621 | 72.54 | 1,994 |
| 2014 | 405,707.09 | 8,645 | 4,633 | 433,531 | 73.52 | 5,897 |
| 2015 | 966,020.00 | 8,242 | 4,417 | 1,038,885 | 62.79 | 16,545 |
| | 93,718,745.32 | 38,114,839 | 20,425,400 | 80,790,845 | | 1,786,725 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 45.2 1.91

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P11 - PRINTERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 6-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2010 | 33,674.17 | 30,868 | 33,674 | | | |
| 2011 | 109,892.75 | 82,420 | 109,893 | | | |
| 2012 | 442,736.53 | 258,262 | 440,915 | 1,822 | 2.50 | 729 |
| 2013 | 234,151.87 | 97,564 | 166,565 | 67,587 | 3.50 | 19,311 |
| 2014 | 127,631.90 | 31,908 | 54,475 | 73,157 | 4.50 | 16,257 |
| 2015 | 89,913.38 | 7,492 | 12,791 | 77,123 | 5.50 | 14,022 |
| | 1,038,000.60 | 508,514 | 818,313 | 219,688 | | 50,319 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 4.4 4.85

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P12 - PROTECTIVE CONTROL AND RELAY PANELS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 35-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1967 | 284,441.83 | 263,069 | 284,442 | | | |
| 1968 | 57,082.00 | 52,369 | 57,082 | | | |
| 1980 | 274,001.64 | 220,533 | 274,002 | | | |
| 1984 | 65,632.30 | 48,999 | 65,632 | | | |
| 1987 | 97,943.45 | 68,057 | 97,943 | | | |
| 1988 | 11,036.18 | 7,467 | 11,036 | | | |
| 1995 | 81,935.56 | 43,543 | 69,049 | 12,887 | 16.40 | 786 |
| 1996 | 422,516.97 | 214,879 | 340,748 | 81,769 | 17.20 | 4,754 |
| 1999 | 123,789.76 | 54,256 | 86,037 | 37,753 | 19.66 | 1,920 |
| 2003 | 1,715,668.03 | 581,371 | 921,918 | 793,750 | 23.14 | 34,302 |
| 2004 | 267,884.42 | 83,885 | 133,022 | 134,862 | 24.04 | 5,610 |
| 2005 | 136,944.76 | 39,322 | 62,355 | 74,590 | 24.95 | 2,990 |
| 2006 | 84,139.78 | 21,949 | 34,806 | 49,334 | 25.87 | 1,907 |
| 2007 | 417,771.63 | 97,880 | 155,215 | 262,557 | 26.80 | 9,797 |
| 2008 | 67,175.89 | 13,934 | 22,096 | 45,080 | 27.74 | 1,625 |
| 2009 | 143,451.35 | 25,863 | 41,013 | 102,438 | 28.69 | 3,571 |
| 2010 | 77,951.21 | 11,916 | 18,896 | 59,055 | 29.65 | 1,992 |
| 2011 | 272,015.61 | 34,119 | 54,105 | 217,911 | 30.61 | 7,119 |
| 2012 | 1,802,811.24 | 176,153 | 279,337 | 1,523,474 | 31.58 | 48,242 |
| 2013 | 1,875,300.36 | 131,271 | 208,164 | 1,667,136 | 32.55 | 51,218 |
| 2014 | 424,664.40 | 17,836 | 28,284 | 396,380 | 33.53 | 11,822 |
| 2015 | 802,970.72 | 13,490 | 21,392 | 781,579 | 29.26 | 26,712 |
| | 9,507,129.09 | 2,222,161 | 3,266,574 | 6,240,555 | | 214,367 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 29.1 2.25

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R01 - RADIO TOWERS (WOOD OR STEEL)

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 48-R3 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1980 | 1,129,316.10 | 830,927 | 1,287,420 | | | |
| 1982 | 163,082.69 | 114,492 | 185,914 | | | |
| 1984 | 345,750.61 | 230,747 | 394,156 | | | |
| 1990 | 60,871.98 | 33,844 | 69,394 | | | |
| 1993 | 20,347.95 | 10,110 | 23,197 | | | |
| 2001 | 2,219,146.63 | 731,019 | 1,700,743 | 829,084 | 34.13 | 24,292 |
| 2003 | 4,407,288.75 | 1,259,192 | 2,929,557 | 2,094,752 | 35.97 | 58,236 |
| 2005 | 231,191.05 | 55,732 | 129,663 | 133,895 | 37.85 | 3,538 |
| 2007 | 365,470.35 | 71,695 | 166,801 | 249,835 | 39.74 | 6,287 |
| 2009 | 181,643.40 | 27,350 | 63,631 | 143,442 | 41.66 | 3,443 |
| 2010 | 214,646.98 | 27,377 | 63,694 | 181,004 | 42.63 | 4,246 |
| 2012 | 157,380.61 | 12,821 | 29,828 | 149,586 | 44.57 | 3,356 |
| 2013 | 262,969.06 | 15,301 | 35,598 | 264,186 | 45.55 | 5,800 |
| | 9,759,106.16 | 3,420,607 | 7,079,596 | 4,045,785 | | 109,198 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 37.0 1.12

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R02 - RADIOS - FIXED MICROWAVE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 19-R5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1980 | 133,758.69 | 133,759 | 133,759 | | | |
| 2001 | 2,927,352.03 | 2,183,190 | 2,716,833 | 210,519 | 4.83 | 43,586 |
| 2003 | 1,936,460.85 | 1,263,792 | 1,572,704 | 363,757 | 6.60 | 55,115 |
| 2007 | 184,426.72 | 82,507 | 102,674 | 81,753 | 10.50 | 7,786 |
| 2010 | 52,446.64 | 15,182 | 18,893 | 33,554 | 13.50 | 2,485 |
| 2012 | 42,443.68 | 7,819 | 9,730 | 32,714 | 15.50 | 2,111 |
| 2014 | 935,875.16 | 73,887 | 91,948 | 843,927 | 17.50 | 48,224 |
| | 6,212,763.77 | 3,760,136 | 4,646,541 | 1,566,223 | | 159,307 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 9.8 2.56

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R03 - RADIOS - FIXED UHF EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 15-L0.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2008 | 39,521.58 | 12,094 | 16,134 | 23,388 | 10.41 | 2,247 |
| 2009 | 49,779.53 | 13,805 | 18,417 | 31,363 | 10.84 | 2,893 |
| 2012 | 8,976.21 | 1,544 | 2,060 | 6,916 | 12.42 | 557 |
| 2015 | 3,385.14 | 198 | 264 | 3,121 | 8.04 | 388 |
| | 101,662.46 | 27,641 | 36,875 | 64,787 | | 6,085 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 10.6 5.99

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R04 - RADIOS - FIXED VHF EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 19-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1992 | 161,678.78 | 143,128 | 161,679 | | | |
| 2003 | 118,245.16 | 69,330 | 106,929 | 11,316 | 7.86 | 1,440 |
| 2004 | 560.00 | 306 | 472 | 88 | 8.61 | 10 |
| 2006 | 211,040.32 | 97,524 | 150,413 | 60,627 | 10.22 | 5,932 |
| 2010 | 68,641.70 | 19,039 | 29,364 | 39,278 | 13.73 | 2,861 |
| | 560,165.96 | 329,327 | 448,857 | 111,309 | | 10,243 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 10.9 1.83

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R05 - RADIOS - MOBILE VHF BASE STATION

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 15-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1990 | 3,162.00 | 3,162 | 3,162 | | | |
| 1999 | 25,964.56 | 23,195 | 25,965 | | | |
| 2000 | 13,354.38 | 11,592 | 13,354 | | | |
| 2003 | 142,198.39 | 107,407 | 132,744 | 9,454 | 3.67 | 2,576 |
| 2004 | 2,800.00 | 1,982 | 2,450 | 350 | 4.38 | 80 |
| 2006 | 5,570,753.44 | 3,364,735 | 4,158,470 | 1,412,283 | 5.94 | 237,758 |
| 2007 | 449,236.51 | 245,881 | 303,884 | 145,353 | 6.79 | 21,407 |
| 2010 | 353,405.39 | 128,170 | 158,405 | 195,000 | 9.56 | 20,397 |
| 2011 | 2,650.00 | 790 | 976 | 1,674 | 10.53 | 159 |
| 2012 | 715,139.17 | 165,912 | 205,051 | 510,089 | 11.52 | 44,279 |
| | 7,278,663.84 | 4,052,826 | 5,004,461 | 2,274,203 | | 326,656 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 7.0 4.49

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R06 - RAMPS - YARD STORAGE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 25-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1975 | 23,739.53 | 23,331 | 23,740 | | | |
| 1979 | 41,423.85 | 39,104 | 41,424 | | | |
| 1982 | 17,210.71 | 15,717 | 17,211 | | | |
| 1987 | 32,563.96 | 27,849 | 32,564 | | | |
| 1989 | 105,848.63 | 87,304 | 102,299 | 3,550 | 4.38 | 811 |
| 1990 | 80,081.66 | 64,674 | 75,782 | 4,300 | 4.81 | 894 |
| 1991 | 18,109.67 | 14,285 | 16,739 | 1,371 | 5.28 | 260 |
| 1992 | 11,484.17 | 8,824 | 10,340 | 1,144 | 5.79 | 198 |
| 1993 | 49,461.82 | 36,918 | 43,259 | 6,203 | 6.34 | 978 |
| 1996 | 49,965.87 | 33,617 | 39,391 | 10,575 | 8.18 | 1,293 |
| 1999 | 91,261.53 | 53,662 | 62,879 | 28,383 | 10.30 | 2,756 |
| 2001 | 54,773.84 | 28,855 | 33,811 | 20,963 | 11.83 | 1,772 |
| 2005 | 37,371.68 | 14,724 | 17,253 | 20,119 | 15.15 | 1,328 |
| 2006 | 157,317.16 | 56,508 | 66,213 | 91,104 | 16.02 | 5,687 |
| 2007 | 62,524.29 | 20,233 | 23,708 | 38,816 | 16.91 | 2,295 |
| 2008 | 128,268.49 | 36,839 | 43,166 | 85,102 | 17.82 | 4,776 |
| 2009 | 275,236.83 | 68,809 | 80,627 | 194,610 | 18.75 | 10,379 |
| 2010 | 194,580.30 | 41,407 | 48,519 | 146,061 | 19.68 | 7,422 |
| 2014 | 30,779.66 | 1,810 | 2,121 | 28,659 | 23.53 | 1,218 |
| 2015 | 131,553.97 | 3,078 | 3,607 | 127,947 | 20.87 | 6,131 |
| | 1,593,557.62 | 677,548 | 784,653 | 808,905 | | 48,198 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 16.8 3.02

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R07 - REACTORS AND RESISTORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 40-S4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1968 | 20,083.02 | 18,366 | 14,534 | 5,549 | 3.42 | 1,623 |
| 1977 | 30,440.00 | 25,729 | 20,361 | 10,079 | 6.19 | 1,628 |
| 1978 | 8,000.00 | 6,674 | 5,282 | 2,718 | 6.63 | 410 |
| 1981 | 11,332.11 | 9,026 | 7,143 | 4,189 | 8.14 | 515 |
| 1995 | 706,182.60 | 361,389 | 285,991 | 420,192 | 19.53 | 21,515 |
| 1996 | 31,021.13 | 15,107 | 11,955 | 19,066 | 20.52 | 929 |
| 2000 | 201,957.01 | 78,258 | 61,931 | 140,026 | 24.50 | 5,715 |
| 2006 | 15,887.39 | 3,773 | 2,986 | 12,901 | 30.50 | 423 |
| 2012 | 19,747.12 | 1,728 | 1,368 | 18,379 | 36.50 | 504 |
| 2014 | 105,579.69 | 3,959 | 3,133 | 102,447 | 38.50 | 2,661 |
| 2015 | 74,835.30 | 965 | 763 | 74,072 | 38.26 | 1,936 |
| | 1,225,065.37 | 524,974 | 415,447 | 809,618 | | 37,859 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 21.4 3.09

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R08- RECLOSERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 48-R3 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1967 | 6,652.00 | 5,770 | 7,184 | | | |
| 1968 | 56,551.87 | 48,453 | 61,076 | | | |
| 1970 | 127,939.91 | 106,740 | 138,175 | | | |
| 1971 | 23,480.43 | 19,310 | 25,359 | | | |
| 1975 | 254,501.39 | 196,067 | 274,862 | | | |
| 1976 | 13,304.00 | 10,064 | 14,113 | 255 | 14.38 | 18 |
| 1978 | 51,386.25 | 37,380 | 52,420 | 3,077 | 15.67 | 196 |
| 1979 | 14,000.00 | 9,973 | 13,986 | 1,134 | 16.34 | 69 |
| 1981 | 247,844.16 | 168,855 | 236,796 | 30,876 | 17.72 | 1,742 |
| 1982 | 210,284.73 | 139,860 | 196,134 | 30,974 | 18.44 | 1,680 |
| 1983 | 13,679.99 | 8,877 | 12,449 | 2,325 | 19.16 | 121 |
| 1984 | 195,909.41 | 123,864 | 173,702 | 37,880 | 19.90 | 1,904 |
| 1985 | 148,118.05 | 91,148 | 127,822 | 32,145 | 20.65 | 1,557 |
| 1986 | 10,486.97 | 6,272 | 8,796 | 2,530 | 21.42 | 118 |
| 1987 | 120,202.29 | 69,805 | 97,892 | 31,926 | 22.19 | 1,439 |
| 1988 | 192,446.10 | 108,338 | 151,929 | 55,913 | 22.98 | 2,433 |
| 1989 | 80,623.21 | 43,935 | 61,613 | 25,460 | 23.78 | 1,071 |
| 1990 | 168,883.99 | 88,956 | 124,748 | 57,647 | 24.59 | 2,344 |
| 1991 | 53,470.41 | 27,177 | 38,112 | 19,636 | 25.41 | 773 |
| 1992 | 68,483.94 | 33,529 | 47,020 | 26,943 | 26.24 | 1,027 |
| 1993 | 42,735.36 | 20,115 | 28,209 | 17,945 | 27.08 | 663 |
| 1994 | 308,115.99 | 139,136 | 195,119 | 137,646 | 27.93 | 4,928 |
| 1995 | 78,765.23 | 34,044 | 47,742 | 37,324 | 28.79 | 1,296 |
| 1996 | 46,812.70 | 19,328 | 27,105 | 23,453 | 29.65 | 791 |
| 1997 | 152,244.41 | 59,844 | 83,923 | 80,501 | 30.53 | 2,637 |
| 1998 | 225,640.57 | 84,176 | 118,045 | 125,647 | 31.42 | 3,999 |
| 1999 | 28,552.97 | 10,080 | 14,136 | 16,701 | 32.31 | 517 |
| 2000 | 125,112.26 | 41,607 | 58,348 | 76,773 | 33.22 | 2,311 |
| 2001 | 74,492.85 | 23,247 | 32,601 | 47,851 | 34.13 | 1,402 |
| 2002 | 36,048.05 | 10,503 | 14,729 | 24,203 | 35.05 | 691 |
| 2003 | 243,555.38 | 65,923 | 92,448 | 170,592 | 35.97 | 4,743 |
| 2004 | 7,409.35 | 1,849 | 2,593 | 5,409 | 36.91 | 147 |
| 2005 | 184,703.55 | 42,182 | 59,154 | 140,326 | 37.85 | 3,707 |
| 2006 | 44,673.53 | 9,258 | 12,983 | 35,264 | 38.79 | 909 |
| 2008 | 156,994.85 | 25,786 | 36,161 | 133,393 | 40.70 | 3,277 |
| 2009 | 191,161.39 | 27,268 | 38,240 | 168,214 | 41.66 | 4,038 |
| 2010 | 460,161.79 | 55,602 | 77,974 | 419,001 | 42.63 | 9,829 |
| 2011 | 294,224.11 | 29,129 | 40,849 | 276,913 | 43.60 | 6,351 |
| 2012 | 786,434.97 | 60,695 | 85,116 | 764,234 | 44.57 | 17,147 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R08- RECLOSERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 48-R3 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 2013 | 767,583.00 | 42,312 | 59,337 | 769,653 | 45.55 | 16,897 |
| 2014 | 286,332.34 | 9,469 | 13,279 | 295,960 | 46.53 | 6,361 |
| 2015 | 558,602.79 | 7,420 | 10,405 | 592,886 | 40.15 | 14,767 |
| | 7,158,606.54 | 2,163,346 | 3,012,684 | 4,718,611 | | 123,900 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 38.1 | 1.73 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R09 - REGULATORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 40-S0.5 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1968 | 18,866.12 | 14,594 | 18,554 | 1,821 | 11.35 | 160 |
| 1970 | 54,167.14 | 40,760 | 51,819 | 6,682 | 12.13 | 551 |
| 1971 | 180,731.24 | 134,095 | 170,477 | 24,713 | 12.52 | 1,974 |
| 1975 | 236,210.70 | 164,799 | 209,512 | 45,596 | 14.16 | 3,220 |
| 1977 | 37,253.00 | 25,126 | 31,943 | 8,290 | 15.02 | 552 |
| 1980 | 723,370.55 | 461,908 | 587,231 | 194,009 | 16.35 | 11,866 |
| 1981 | 114,979.59 | 72,023 | 91,564 | 32,614 | 16.80 | 1,941 |
| 1982 | 94,913.39 | 58,249 | 74,053 | 28,453 | 17.27 | 1,648 |
| 1983 | 36,438.00 | 21,900 | 27,842 | 11,511 | 17.74 | 649 |
| 1984 | 65,838.76 | 38,717 | 49,221 | 21,885 | 18.22 | 1,201 |
| 1985 | 228,343.71 | 131,259 | 166,872 | 79,739 | 18.71 | 4,262 |
| 1987 | 96,206.56 | 52,679 | 66,972 | 36,931 | 19.72 | 1,873 |
| 1988 | 101,884.72 | 54,358 | 69,106 | 40,929 | 20.24 | 2,022 |
| 1989 | 2,844.72 | 1,477 | 1,878 | 1,194 | 20.77 | 57 |
| 1990 | 120,936.14 | 61,061 | 77,628 | 52,983 | 21.30 | 2,487 |
| 1993 | 97,861.56 | 44,971 | 57,172 | 48,518 | 22.98 | 2,111 |
| 1994 | 24,330.81 | 10,793 | 13,721 | 12,556 | 23.57 | 533 |
| 1995 | 65,641.15 | 28,073 | 35,690 | 35,202 | 24.16 | 1,457 |
| 1997 | 103,909.72 | 40,989 | 52,110 | 60,112 | 25.39 | 2,368 |
| 2000 | 18,916.42 | 6,466 | 8,220 | 12,210 | 27.34 | 447 |
| 2001 | 5,317.92 | 1,719 | 2,185 | 3,558 | 28.03 | 127 |
| 2002 | 26,690.60 | 8,129 | 10,335 | 18,491 | 28.72 | 644 |
| 2003 | 150,883.10 | 43,020 | 54,692 | 108,262 | 29.44 | 3,677 |
| 2004 | 122,332.16 | 32,468 | 41,277 | 90,842 | 30.17 | 3,011 |
| 2005 | 36,569.64 | 8,975 | 11,410 | 28,085 | 30.91 | 909 |
| 2006 | 89,712.14 | 20,153 | 25,621 | 71,268 | 31.68 | 2,250 |
| 2007 | 71,728.09 | 14,583 | 18,540 | 58,926 | 32.47 | 1,815 |
| 2008 | 243,153.44 | 44,183 | 56,170 | 206,436 | 33.27 | 6,205 |
| 2009 | 402,868.52 | 64,177 | 81,589 | 353,509 | 34.10 | 10,367 |
| 2010 | 317,705.00 | 43,405 | 55,181 | 287,940 | 34.94 | 8,241 |
| 2011 | 342,450.78 | 38,741 | 49,252 | 320,595 | 35.81 | 8,953 |
| 2012 | 616,673.74 | 54,946 | 69,854 | 596,154 | 36.70 | 16,244 |
| 2013 | 537,169.67 | 34,664 | 44,068 | 536,075 | 37.61 | 14,254 |
| 2014 | 158,574.53 | 6,251 | 7,947 | 163,313 | 38.54 | 4,237 |
| 2015 | 122,166.67 | 2,375 | 3,020 | 128,920 | 27.20 | 4,740 |
| | 5,667,640.00 | 1,882,086 | 2,392,726 | 3,728,325 | | 127,053 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 29.3 2.24

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R11- REVENUE METERING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 35-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1967 | 12,751.00 | 11,793 | 12,045 | 706 | 2.63 | 268 |
| 1968 | 6,820.00 | 6,257 | 6,391 | 429 | 2.89 | 148 |
| 1970 | 8,301.90 | 7,493 | 7,653 | 649 | 3.41 | 190 |
| 1974 | 13,100.00 | 11,397 | 11,640 | 1,460 | 4.55 | 321 |
| 1976 | 9,983.00 | 8,497 | 8,678 | 1,305 | 5.21 | 250 |
| 1977 | 8,738.30 | 7,345 | 7,502 | 1,236 | 5.58 | 222 |
| 1978 | 37,976.15 | 31,499 | 32,171 | 5,805 | 5.97 | 972 |
| 1979 | 7,907.86 | 6,464 | 6,602 | 1,306 | 6.39 | 204 |
| 1980 | 37,702.15 | 30,345 | 30,993 | 6,709 | 6.83 | 982 |
| 1981 | 32,616.27 | 25,813 | 26,364 | 6,252 | 7.30 | 856 |
| 1982 | 2,521.70 | 1,960 | 2,002 | 520 | 7.80 | 67 |
| 1983 | 33,124.09 | 25,250 | 25,789 | 7,335 | 8.32 | 882 |
| 1984 | 29,812.28 | 22,257 | 22,732 | 7,080 | 8.87 | 798 |
| 1985 | 14,504.27 | 10,588 | 10,814 | 3,690 | 9.45 | 390 |
| 1986 | 43,276.88 | 30,850 | 31,509 | 11,768 | 10.05 | 1,171 |
| 1987 | 34,327.14 | 23,853 | 24,362 | 9,965 | 10.68 | 933 |
| 1988 | 31,848.65 | 21,548 | 22,008 | 9,841 | 11.32 | 869 |
| 1989 | 23,844.81 | 15,676 | 16,011 | 7,834 | 11.99 | 653 |
| 1990 | 15,631.27 | 9,968 | 10,181 | 5,450 | 12.68 | 430 |
| 1991 | 16,516.52 | 10,198 | 10,416 | 6,101 | 13.39 | 456 |
| 1992 | 34,331.48 | 20,481 | 20,918 | 13,413 | 14.12 | 950 |
| 1994 | 5,484.96 | 3,036 | 3,101 | 2,384 | 15.63 | 153 |
| 1995 | 7,534.74 | 4,004 | 4,089 | 3,446 | 16.40 | 210 |
| 1996 | 29,464.09 | 14,985 | 15,305 | 14,159 | 17.20 | 823 |
| 1997 | 9,378.65 | 4,555 | 4,652 | 4,727 | 18.00 | 263 |
| 2001 | 121,485.76 | 47,275 | 48,284 | 73,202 | 21.38 | 3,424 |
| 2002 | 86,636.39 | 31,561 | 32,234 | 54,402 | 22.25 | 2,445 |
| 2003 | 39,573.82 | 13,410 | 13,696 | 25,878 | 23.14 | 1,118 |
| 2009 | 89,696.48 | 16,171 | 16,516 | 73,180 | 28.69 | 2,551 |
| 2012 | 27,330.13 | 2,670 | 2,727 | 24,603 | 31.58 | 779 |
| 2014 | 87,162.67 | 3,661 | 3,739 | 83,424 | 33.53 | 2,488 |
| 2015 | 283,532.20 | 4,763 | 4,865 | 278,667 | 29.26 | 9,524 |
| | 1,242,915.61 | 485,623 | 495,989 | 746,926 | | 35,790 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 20.9 2.88

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R12 - RIGHT-OF-WAYS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1966 | 1,057,755.13 | 745,315 | 833,259 | 224,496 | 19.20 | 11,692 |
| 1967 | 1,713,673.55 | 1,187,970 | 1,328,145 | 385,529 | 19.94 | 19,334 |
| 1968 | 274,316.09 | 186,999 | 209,064 | 65,252 | 20.69 | 3,154 |
| 1969 | 85,289.66 | 57,131 | 63,872 | 21,418 | 21.46 | 998 |
| 1970 | 299,538.55 | 197,096 | 220,352 | 79,187 | 22.23 | 3,562 |
| 1973 | 5,734.27 | 3,562 | 3,982 | 1,752 | 24.62 | 71 |
| 1974 | 574,591.95 | 349,708 | 390,972 | 183,620 | 25.44 | 7,218 |
| 1976 | 134,344.85 | 78,292 | 87,530 | 46,815 | 27.12 | 1,726 |
| 1977 | 25,664.00 | 14,621 | 16,346 | 9,318 | 27.97 | 333 |
| 1978 | 2,890,160.13 | 1,608,259 | 1,798,026 | 1,092,134 | 28.83 | 37,882 |
| 1980 | 122,188.63 | 64,704 | 72,339 | 49,850 | 30.58 | 1,630 |
| 1981 | 1,116,248.39 | 575,817 | 643,761 | 472,487 | 31.47 | 15,014 |
| 1982 | 793,264.95 | 398,219 | 445,207 | 348,058 | 32.37 | 10,752 |
| 1983 | 1,786,100.11 | 871,617 | 974,464 | 811,636 | 33.28 | 24,388 |
| 1984 | 66,937.79 | 31,718 | 35,461 | 31,477 | 34.20 | 920 |
| 1985 | 1,714,103.64 | 787,956 | 880,931 | 833,173 | 35.12 | 23,724 |
| 1986 | 39,975.47 | 17,804 | 19,905 | 20,070 | 36.05 | 557 |
| 1987 | 563,160.38 | 242,677 | 271,312 | 291,848 | 36.99 | 7,890 |
| 1988 | 175,696.96 | 73,171 | 81,805 | 93,892 | 37.93 | 2,475 |
| 1989 | 549,774.56 | 220,927 | 246,995 | 302,780 | 38.88 | 7,788 |
| 1990 | 786,220.76 | 304,448 | 340,371 | 445,850 | 39.83 | 11,194 |
| 1991 | 168,758.87 | 62,856 | 70,273 | 98,486 | 40.79 | 2,414 |
| 1992 | 23,974.15 | 8,575 | 9,587 | 14,387 | 41.75 | 345 |
| 1993 | 88,237.17 | 30,245 | 33,814 | 54,423 | 42.72 | 1,274 |
| 1994 | 36,190.83 | 11,865 | 13,265 | 22,926 | 43.69 | 525 |
| 1995 | 324,798.29 | 101,636 | 113,629 | 211,169 | 44.66 | 4,728 |
| 1996 | 531,645.83 | 158,351 | 177,036 | 354,610 | 45.64 | 7,770 |
| 1997 | 182,916.05 | 51,723 | 57,826 | 125,090 | 46.62 | 2,683 |
| 1998 | 590,349.41 | 158,031 | 176,678 | 413,671 | 47.60 | 8,691 |
| 1999 | 103,742.35 | 26,207 | 29,299 | 74,443 | 48.58 | 1,532 |
| 2000 | 15,017.65 | 3,565 | 3,986 | 11,032 | 49.57 | 223 |
| 2001 | 10,532.16 | 2,340 | 2,616 | 7,916 | 50.56 | 157 |
| 2002 | 1,429,050.07 | 295,699 | 330,590 | 1,098,460 | 51.55 | 21,309 |
| 2003 | 32,707.00 | 6,270 | 7,010 | 25,697 | 52.54 | 489 |
| 2004 | 79,298.85 | 13,993 | 15,644 | 63,655 | 53.53 | 1,189 |
| 2005 | 128,687.90 | 20,729 | 23,175 | 105,513 | 54.53 | 1,935 |
| 2006 | 1,128,537.74 | 164,597 | 184,018 | 944,520 | 55.52 | 17,012 |
| 2007 | 99,457.18 | 12,975 | 14,506 | 84,951 | 56.52 | 1,503 |
| 2008 | 149,366.07 | 17,211 | 19,242 | 130,124 | 57.51 | 2,263 |
| 2009 | 166,356.00 | 16,611 | 18,571 | 147,785 | 58.51 | 2,526 |
| 2010 | 97,644.83 | 8,247 | 9,220 | 88,425 | 59.51 | 1,486 |
| 2011 | 13,878.97 | 959 | 1,072 | 12,807 | 60.51 | 212 |
| 2012 | 345,323.60 | 18,596 | 20,790 | 324,534 | 61.50 | 5,277 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R12 - RIGHT-OF-WAYS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2013 | 444,049.95 | 17,078 | 19,093 | 424,957 | 62.50 | 6,799 |
| 2014 | 311,667.47 | 7,193 | 8,042 | 303,625 | 63.50 | 4,781 |
| 2015 | 452,720.59 | 3,712 | 4,150 | 448,570 | 60.48 | 7,417 |
| | 21,729,648.80 | 9,237,275 | 10,327,231 | 11,402,418 | | 296,842 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 38.4 | 1.37 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R13 - ROADS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 60-R4 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1967 | 40,992.69 | 32,673 | 12,330 | 31,942 | 15.72 | 2,032 |
| 1968 | 22,493.01 | 17,644 | 6,658 | 17,634 | 16.42 | 1,074 |
| 1969 | 490,478.00 | 378,392 | 142,796 | 386,920 | 17.14 | 22,574 |
| 1970 | 128,175.47 | 97,201 | 36,681 | 101,749 | 17.87 | 5,694 |
| 1971 | 27,000.00 | 20,115 | 7,591 | 21,569 | 18.61 | 1,159 |
| 1973 | 11,211.47 | 8,046 | 3,036 | 9,072 | 20.13 | 451 |
| 1977 | 11,758.50 | 7,761 | 2,929 | 9,770 | 23.33 | 419 |
| 1978 | 11,048.80 | 7,128 | 2,690 | 9,243 | 24.16 | 383 |
| 1979 | 5,061.00 | 3,188 | 1,203 | 4,263 | 25.00 | 171 |
| 1980 | 3,165,500.82 | 1,945,845 | 734,317 | 2,684,424 | 25.85 | 103,846 |
| 1981 | 15,766.30 | 9,447 | 3,565 | 13,463 | 26.71 | 504 |
| 1982 | 2,911.13 | 1,698 | 641 | 2,503 | 27.59 | 91 |
| 1983 | 9,598,932.99 | 5,447,778 | 2,055,866 | 8,310,982 | 28.47 | 291,921 |
| 1984 | 60,540,101.27 | 33,389,295 | 12,600,352 | 52,782,957 | 29.36 | 1,797,785 |
| 1985 | 316,785.74 | 169,525 | 63,975 | 278,154 | 30.27 | 9,189 |
| 1986 | 13,242.22 | 6,869 | 2,592 | 11,710 | 31.18 | 376 |
| 1988 | 1,306,655.61 | 634,329 | 239,381 | 1,171,807 | 33.03 | 35,477 |
| 1989 | 363,353.41 | 170,311 | 64,271 | 328,151 | 33.96 | 9,663 |
| 1990 | 52,244.27 | 23,604 | 8,908 | 47,516 | 34.90 | 1,361 |
| 1991 | 54,563.98 | 23,719 | 8,951 | 49,978 | 35.85 | 1,394 |
| 1993 | 5,411.45 | 2,166 | 817 | 5,027 | 37.76 | 133 |
| 1994 | 25,140.01 | 9,630 | 3,634 | 23,517 | 38.72 | 607 |
| 1995 | 10,006.93 | 3,658 | 1,380 | 9,427 | 39.69 | 238 |
| 1996 | 3,959.23 | 1,378 | 520 | 3,756 | 40.66 | 92 |
| 1997 | 15,649.07 | 5,172 | 1,952 | 14,949 | 41.64 | 359 |
| 2000 | 155,870.51 | 43,263 | 16,326 | 152,014 | 44.58 | 3,410 |
| 2001 | 432,343.06 | 112,297 | 42,378 | 424,553 | 45.57 | 9,317 |
| 2002 | 44,013.10 | 10,648 | 4,018 | 43,516 | 46.56 | 935 |
| 2003 | 767,915.72 | 172,090 | 64,943 | 764,406 | 47.55 | 16,076 |
| 2005 | 1,358,343.31 | 255,993 | 96,606 | 1,370,405 | 49.53 | 27,668 |
| 2007 | 935,334.53 | 142,766 | 53,877 | 956,284 | 51.52 | 18,561 |
| 2008 | 404,864.35 | 54,582 | 20,598 | 416,655 | 52.51 | 7,935 |
| 2009 | 324,318.06 | 37,888 | 14,298 | 335,966 | 53.51 | 6,279 |
| 2010 | 983,257.78 | 97,166 | 36,669 | 1,025,249 | 54.51 | 18,808 |
| 2011 | 1,053,370.50 | 85,130 | 32,126 | 1,105,514 | 55.51 | 19,916 |
| 2012 | 245,591.86 | 15,471 | 5,839 | 259,400 | 56.50 | 4,591 |
| 2013 | 51,671.03 | 2,325 | 877 | 54,928 | 57.50 | 955 |
| 2014 | 505,599.92 | 13,651 | 5,152 | 540,896 | 58.50 | 9,246 |
| 2015 | 939,809.96 | 8,932 | 3,371 | 1,011,624 | 56.00 | 18,065 |
| | 84,440,747.06 | 43,468,774 | 16,404,114 | 74,791,893 | | 2,448,755 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 30.5 2.90

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R14 - ROUTERS AND LAN

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 5-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2011 | 651,646.86 | 586,482 | 651,647 | | | |
| 2012 | 673,410.48 | 471,387 | 673,410 | | | |
| 2013 | 268,747.57 | 134,374 | 223,667 | 45,081 | 2.50 | 18,032 |
| 2014 | 286,810.01 | 86,043 | 143,219 | 143,591 | 3.50 | 41,026 |
| 2015 | 850,362.78 | 85,036 | 141,544 | 708,819 | 4.50 | 157,515 |
| | 2,730,977.70 | 1,363,322 | 1,833,487 | 897,491 | | 216,573 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 4.1 7.93

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R15 - RUNNER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1967 | 5,230,693.06 | 4,368,099 | 3,187,705 | 2,042,988 | 9.07 | 225,247 |
| 1968 | 1,448,949.16 | 1,192,355 | 870,144 | 578,805 | 9.74 | 59,426 |
| 1970 | 1,458,564.95 | 1,161,820 | 847,861 | 610,704 | 11.19 | 54,576 |
| 1977 | 130,312.00 | 90,034 | 65,704 | 64,608 | 17.00 | 3,800 |
| 1980 | 50,343.45 | 32,266 | 23,547 | 26,796 | 19.75 | 1,357 |
| 1985 | 2,644,906.00 | 1,464,326 | 1,068,620 | 1,576,286 | 24.55 | 64,207 |
| 1989 | 583,387.23 | 280,983 | 205,053 | 378,334 | 28.51 | 13,270 |
| 1994 | 16,158.41 | 6,316 | 4,609 | 11,549 | 33.50 | 345 |
| 1996 | 59,841.42 | 21,217 | 15,483 | 44,358 | 35.50 | 1,250 |
| 1998 | 46,687.84 | 14,855 | 10,841 | 35,847 | 37.50 | 956 |
| | 11,669,843.52 | 8,632,271 | 6,299,567 | 5,370,277 | | 424,434 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 12.7 3.64

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S01 - SCADA EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 20-L3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1980 | 127,277.80 | 111,686 | 127,278 | | | |
| 1986 | 55,464.80 | 44,705 | 55,465 | | | |
| 1989 | 27,913.07 | 21,409 | 27,913 | | | |
| 1990 | 73,377.15 | 55,363 | 73,377 | | | |
| 1995 | 14,286.26 | 10,058 | 14,286 | | | |
| 1998 | 18,979.59 | 12,821 | 18,443 | 537 | 6.49 | 83 |
| 1999 | 180,642.42 | 119,495 | 171,893 | 8,749 | 6.77 | 1,292 |
| 2001 | 330,081.74 | 205,641 | 295,813 | 34,269 | 7.54 | 4,545 |
| 2002 | 398,819.76 | 238,095 | 342,498 | 56,322 | 8.06 | 6,988 |
| 2003 | 562,865.09 | 318,863 | 458,682 | 104,183 | 8.67 | 12,016 |
| 2004 | 343,355.76 | 182,665 | 262,763 | 80,593 | 9.36 | 8,610 |
| 2005 | 203,547.66 | 100,553 | 144,645 | 58,903 | 10.12 | 5,820 |
| 2006 | 225,887.94 | 102,327 | 147,197 | 78,691 | 10.94 | 7,193 |
| 2007 | 275,766.06 | 113,064 | 162,642 | 113,124 | 11.80 | 9,587 |
| 2008 | 280,808.49 | 102,636 | 147,641 | 133,167 | 12.69 | 10,494 |
| 2009 | 251,993.65 | 80,512 | 115,816 | 136,178 | 13.61 | 10,006 |
| 2010 | 366,628.59 | 99,723 | 143,451 | 223,178 | 14.56 | 15,328 |
| 2011 | 86,307.46 | 19,333 | 27,810 | 58,497 | 15.52 | 3,769 |
| 2012 | 73,526.84 | 12,830 | 18,456 | 55,071 | 16.51 | 3,336 |
| 2013 | 209,687.85 | 26,211 | 37,704 | 171,984 | 17.50 | 9,828 |
| 2014 | 27,323.88 | 2,049 | 2,947 | 24,377 | 18.50 | 1,318 |
| 2015 | 795,391.14 | 22,510 | 32,381 | 763,010 | 17.17 | 44,439 |
| | 4,929,933.00 | 2,002,549 | 2,829,101 | 2,100,832 | | 154,652 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 13.6 3.14

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S02 - SECTIONALIZERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 25-R5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1968 | 48,466.85 | 48,467 | 48,467 | | | |
| 1975 | 23,769.58 | 23,770 | 23,770 | | | |
| 1986 | 1,941.08 | 1,855 | 1,531 | 410 | 1.11 | 369 |
| 1989 | 1,726.87 | 1,596 | 1,318 | 409 | 1.89 | 216 |
| 1991 | 46,552.06 | 41,487 | 34,249 | 12,303 | 2.72 | 4,523 |
| 1996 | 22,003.75 | 16,714 | 13,798 | 8,206 | 6.01 | 1,365 |
| 2000 | 4,105.58 | 2,532 | 2,091 | 2,015 | 9.58 | 210 |
| 2010 | 5,443.11 | 1,197 | 988 | 4,455 | 19.50 | 228 |
| | 154,008.88 | 137,618 | 126,212 | 27,797 | | 6,911 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 4.0 4.49

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S03 - SERVERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 7-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2009 | 52,745.62 | 48,978 | 52,746 | | | |
| 2010 | 1,661,109.97 | 1,305,151 | 1,661,110 | | | |
| 2011 | 358,846.88 | 230,688 | 358,847 | | | |
| 2012 | 183,377.26 | 91,689 | 183,377 | | | |
| 2013 | 257,792.01 | 92,068 | 240,975 | 16,817 | 4.50 | 3,737 |
| 2014 | 440,602.61 | 94,417 | 247,122 | 193,481 | 5.50 | 35,178 |
| 2015 | 64,729.57 | 4,624 | 12,103 | 52,627 | 6.50 | 8,096 |
| | 3,019,203.92 | 1,867,615 | 2,756,280 | 262,924 | | 47,011 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.6 1.56

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S04 - SEWAGE DISPOSAL SYSTEM

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1967 | 10,112.35 | 8,443 | 10,719 | | | |
| 1968 | 7,791.63 | 6,406 | 8,259 | | | |
| 1969 | 132,528.13 | 107,276 | 140,480 | | | |
| 1970 | 14,085.17 | 11,217 | 14,930 | | | |
| 1971 | 1,387.00 | 1,086 | 1,470 | | | |
| 1972 | 4,653.28 | 3,580 | 4,932 | | | |
| 1977 | 7,861.00 | 5,483 | 8,333 | | | |
| 1978 | 34,016.40 | 23,208 | 36,057 | | | |
| 1980 | 143,118.72 | 93,202 | 151,706 | | | |
| 1981 | 2,667.48 | 1,694 | 2,828 | | | |
| 1982 | 3,000.00 | 1,857 | 3,180 | | | |
| 1983 | 95,005.41 | 57,256 | 100,706 | | | |
| 1988 | 2,697.73 | 1,395 | 2,659 | 201 | 28.16 | 7 |
| 1989 | 308,017.92 | 153,869 | 293,334 | 33,165 | 29.08 | 1,140 |
| 1990 | 50,007.03 | 24,095 | 45,934 | 7,073 | 30.00 | 236 |
| 1992 | 15,841.00 | 7,062 | 13,463 | 3,328 | 31.87 | 104 |
| 1995 | 131,238.24 | 51,270 | 97,741 | 41,372 | 34.73 | 1,191 |
| 1996 | 13,483.21 | 5,015 | 9,561 | 4,731 | 35.70 | 133 |
| 1997 | 4,233.64 | 1,496 | 2,852 | 1,636 | 36.67 | 45 |
| 1998 | 55,598.68 | 18,602 | 35,463 | 23,472 | 37.64 | 624 |
| 1999 | 976,185.68 | 308,171 | 587,493 | 447,264 | 38.62 | 11,581 |
| 2002 | 355,826.77 | 92,167 | 175,706 | 201,470 | 41.56 | 4,848 |
| 2003 | 97,910.98 | 23,493 | 44,787 | 58,999 | 42.55 | 1,387 |
| 2006 | 35,314.99 | 6,445 | 12,287 | 25,147 | 45.53 | 552 |
| 2007 | 58,129.37 | 9,500 | 18,111 | 43,506 | 46.52 | 935 |
| 2008 | 44,604.54 | 6,430 | 12,258 | 35,023 | 47.52 | 737 |
| 2009 | 44,878.73 | 5,613 | 10,700 | 36,871 | 48.51 | 760 |
| 2010 | 125,757.70 | 13,306 | 25,366 | 107,937 | 49.51 | 2,180 |
| 2011 | 143,366.51 | 12,407 | 23,653 | 128,315 | 50.51 | 2,540 |
| | 2,919,319.29 | 1,061,044 | 1,894,968 | 1,199,510 | | 29,000 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 41.4 0.99

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S05 - SOFTWARE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 7-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2009 | 1,013,220.31 | 940,846 | 762,788 | 250,432 | 0.50 | 250,432 |
| 2010 | 1,384,293.79 | 1,087,653 | 881,811 | 502,483 | 1.50 | 334,989 |
| 2011 | 1,302,502.98 | 837,327 | 678,860 | 623,643 | 2.50 | 249,457 |
| 2012 | 1,018,232.31 | 509,116 | 412,764 | 605,468 | 3.50 | 172,991 |
| 2013 | 2,774,542.51 | 990,900 | 803,369 | 1,971,174 | 4.50 | 438,039 |
| 2014 | 1,012,715.03 | 217,015 | 175,944 | 836,771 | 5.50 | 152,140 |
| 2015 | 1,576,292.03 | 112,595 | 91,286 | 1,485,006 | 6.50 | 228,462 |
| | 10,081,798.96 | 4,695,452 | 3,806,822 | 6,274,977 | | 1,826,510 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 3.4 | 18.12 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S06 - SPILLWAY STRUCTURES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 110-R4 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1956 | 37,231.12 | 21,103 | 7,168 | 33,042 | 52.27 | 632 |
| 1966 | 2,136,380.00 | 1,019,407 | 346,252 | 1,961,038 | 61.40 | 31,939 |
| 1967 | 2,261,132.00 | 1,058,055 | 359,379 | 2,082,644 | 62.34 | 33,408 |
| 1979 | 3,482,644.79 | 1,237,115 | 420,199 | 3,341,057 | 73.82 | 45,260 |
| 1982 | 11,830,011.26 | 3,863,076 | 1,312,133 | 11,464,279 | 76.74 | 149,391 |
| 1983 | 2,949.09 | 935 | 318 | 2,867 | 77.72 | 37 |
| 1984 | 6,511,055.23 | 2,000,938 | 679,639 | 6,352,301 | 78.70 | 80,715 |
| 1988 | 28,771.28 | 7,729 | 2,625 | 28,448 | 82.64 | 344 |
| 1991 | 35,581.53 | 8,524 | 2,895 | 35,533 | 85.60 | 415 |
| 1992 | 6,707.73 | 1,542 | 524 | 6,720 | 86.59 | 78 |
| 2003 | 1,737,806.17 | 212,926 | 72,323 | 1,804,508 | 97.52 | 18,504 |
| 2015 | 50,000.00 | 259 | 88 | 53,912 | 102.60 | 525 |
| | 28,120,270.20 | 9,431,609 | 3,203,543 | 27,166,349 | | 361,248 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 75.2 1.28

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S07 - STACKS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R4 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1968 | 1,297,967.37 | 1,087,296 | 1,401,805 | | | |
| 1971 | 430,393.00 | 343,296 | 464,535 | 289 | 14.38 | 20 |
| 1974 | 69,609.69 | 52,584 | 71,155 | 4,023 | 16.53 | 243 |
| 1975 | 661,362.47 | 489,862 | 662,862 | 51,409 | 17.28 | 2,975 |
| 1976 | 8,601.34 | 6,243 | 8,448 | 841 | 18.04 | 47 |
| 1986 | 27,918.81 | 15,701 | 21,246 | 8,906 | 26.36 | 338 |
| 1988 | 6,132.90 | 3,232 | 4,373 | 2,251 | 28.16 | 80 |
| 1992 | 336,677.64 | 152,917 | 206,921 | 156,691 | 31.87 | 4,917 |
| 1995 | 36,955.81 | 14,710 | 19,905 | 20,007 | 34.73 | 576 |
| 1996 | 121,024.55 | 45,866 | 62,064 | 68,643 | 35.70 | 1,923 |
| 2001 | 94,022.28 | 26,623 | 36,025 | 65,519 | 40.58 | 1,615 |
| 2005 | 52,308.82 | 10,754 | 14,552 | 41,942 | 44.53 | 942 |
| 2007 | 108,179.45 | 18,013 | 24,374 | 92,460 | 46.52 | 1,988 |
| 2008 | 289,892.88 | 42,579 | 57,616 | 255,468 | 47.52 | 5,376 |
| 2011 | 527,981.53 | 46,553 | 62,994 | 507,226 | 50.51 | 10,042 |
| 2015 | 3,781,821.18 | 39,618 | 53,610 | 4,030,757 | 51.05 | 78,957 |
| | 7,850,849.72 | 2,395,847 | 3,172,485 | 5,306,433 | | 110,039 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 48.2 1.40

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S08 - STATIC EXCITATION SYSTEM

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 32-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1967 | 951,235.75 | 1,005,477 | 816,518 | 191,792 | 0.09 | 191,792 |
| 1968 | 431,036.26 | 452,901 | 367,787 | 89,111 | 0.28 | 89,111 |
| 1970 | 688,732.45 | 714,316 | 580,075 | 149,981 | 0.69 | 149,981 |
| 1974 | 36,724.00 | 36,944 | 30,001 | 8,926 | 1.63 | 5,476 |
| 1975 | 32,918.00 | 32,832 | 26,662 | 8,231 | 1.89 | 4,355 |
| 1976 | 8,000.00 | 7,910 | 6,423 | 2,057 | 2.15 | 957 |
| 1977 | 8,000.00 | 7,836 | 6,363 | 2,117 | 2.43 | 871 |
| 1980 | 1,489,744.00 | 1,415,294 | 1,149,318 | 429,811 | 3.32 | 129,461 |
| 1982 | 25,045.38 | 23,196 | 18,837 | 7,711 | 4.04 | 1,909 |
| 1988 | 2,134.84 | 1,749 | 1,420 | 843 | 7.27 | 116 |
| 1989 | 219,265.38 | 174,753 | 141,912 | 90,509 | 7.94 | 11,399 |
| 1992 | 127,935.69 | 92,810 | 75,368 | 60,244 | 10.10 | 5,965 |
| 1998 | 20,098.07 | 11,291 | 9,169 | 12,135 | 15.04 | 807 |
| 2002 | 589,435.62 | 259,486 | 210,721 | 414,081 | 18.71 | 22,132 |
| 2003 | 590,425.47 | 241,341 | 195,986 | 429,865 | 19.66 | 21,865 |
| 2004 | 648,715.35 | 244,538 | 198,582 | 489,056 | 20.62 | 23,718 |
| 2012 | 563,071.00 | 65,093 | 52,860 | 543,995 | 28.51 | 19,081 |
| 2013 | 1,219,727.63 | 101,002 | 82,020 | 1,210,891 | 29.50 | 41,047 |
| 2015 | 680,819.64 | 11,980 | 9,729 | 711,940 | 29.53 | 24,109 |
| | 8,333,064.53 | 4,900,749 | 3,979,751 | 4,853,298 | | 744,152 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 6.5 8.93

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S09 - STATIC EXCITATION - TRANSFORMERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 45-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1968 | 92,234.00 | 85,753 | 97,768 | | | |
| 1978 | 6,765.39 | 5,417 | 7,171 | | | |
| 1980 | 265,233.03 | 203,612 | 277,137 | 4,010 | 12.41 | 323 |
| 1982 | 44,965.17 | 32,983 | 44,893 | 2,770 | 13.86 | 200 |
| 1985 | 325,129.00 | 220,719 | 300,422 | 44,215 | 16.18 | 2,733 |
| | 734,326.59 | 548,484 | 727,391 | 50,995 | | 3,256 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 15.7 0.44

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S10 - STATION SERVICE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 50-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1966 | 491,604.69 | 442,415 | 374,999 | 146,102 | 7.55 | 19,351 |
| 1967 | 19,591.00 | 17,423 | 14,768 | 5,998 | 8.05 | 745 |
| 1968 | 7,386.55 | 6,486 | 5,498 | 2,332 | 8.58 | 272 |
| 1970 | 1,022.42 | 873 | 740 | 344 | 9.74 | 35 |
| 1971 | 151,872.00 | 127,628 | 108,180 | 52,804 | 10.36 | 5,097 |
| 1974 | 450.00 | 359 | 304 | 173 | 12.35 | 14 |
| 1975 | 1,500.00 | 1,175 | 996 | 594 | 13.04 | 46 |
| 1977 | 36,906.00 | 27,807 | 23,570 | 15,550 | 14.46 | 1,075 |
| 1978 | 8,987.26 | 6,630 | 5,620 | 3,906 | 15.20 | 257 |
| 1979 | 182,007.25 | 131,384 | 111,364 | 81,564 | 15.95 | 5,114 |
| 1980 | 202,598.85 | 142,984 | 121,196 | 93,559 | 16.71 | 5,599 |
| 1981 | 9,086.29 | 6,262 | 5,308 | 4,323 | 17.49 | 247 |
| 1982 | 7,725.34 | 5,193 | 4,402 | 3,787 | 18.29 | 207 |
| 1983 | 775,442.31 | 507,977 | 430,570 | 391,399 | 19.10 | 20,492 |
| 1985 | 512,446.00 | 317,659 | 269,254 | 273,939 | 20.76 | 13,196 |
| 1986 | 2,856.46 | 1,719 | 1,457 | 1,571 | 21.61 | 73 |
| 1987 | 2,668.56 | 1,557 | 1,320 | 1,509 | 22.48 | 67 |
| 1988 | 69,235.33 | 39,102 | 33,144 | 40,245 | 23.36 | 1,723 |
| 1989 | 98,106.21 | 53,556 | 45,395 | 58,598 | 24.25 | 2,416 |
| 1990 | 25,037.31 | 13,190 | 11,180 | 15,360 | 25.15 | 611 |
| 1991 | 2,774.58 | 1,408 | 1,193 | 1,748 | 26.06 | 67 |
| 1992 | 886.43 | 433 | 367 | 573 | 26.98 | 21 |
| 1993 | 2,443.94 | 1,145 | 971 | 1,620 | 27.91 | 58 |
| 1994 | 42,122.46 | 18,887 | 16,009 | 28,641 | 28.85 | 993 |
| 1995 | 21,028.01 | 9,009 | 7,636 | 14,654 | 29.79 | 492 |
| 1996 | 82,955.52 | 33,854 | 28,695 | 59,238 | 30.75 | 1,926 |
| 2002 | 1,362.83 | 388 | 329 | 1,116 | 36.58 | 31 |
| 2008 | 375,325.90 | 59,518 | 50,448 | 347,397 | 42.52 | 8,170 |
| 2009 | 339,502.31 | 46,711 | 39,593 | 320,279 | 43.51 | 7,361 |
| 2010 | 18,254.70 | 2,125 | 1,801 | 17,549 | 44.51 | 394 |
| 2011 | 26,312.12 | 2,505 | 2,123 | 25,768 | 45.51 | 566 |
| 2012 | 93,881.41 | 6,966 | 5,905 | 93,609 | 46.50 | 2,013 |
| 2013 | 27,928.40 | 1,480 | 1,254 | 28,350 | 47.50 | 597 |
| 2014 | 28,527.93 | 907 | 769 | 29,471 | 48.50 | 608 |
| 2015 | 1,563,499.52 | 17,567 | 14,891 | 1,642,419 | 46.45 | 35,359 |
| | 5,233,335.89 | 2,054,282 | 1,741,249 | 3,806,087 | | 135,293 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 28.1 2.59

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S11 - STOP LOGS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1966 | 137,480.00 | 96,871 | 45,941 | 91,539 | 19.20 | 4,768 |
| 1967 | 148,478.00 | 102,929 | 48,814 | 99,664 | 19.94 | 4,998 |
| 1970 | 20,000.00 | 13,160 | 6,241 | 13,759 | 22.23 | 619 |
| 1979 | 561,958.08 | 305,188 | 144,736 | 417,222 | 29.70 | 14,048 |
| 1982 | 1,290,854.99 | 648,009 | 307,320 | 983,535 | 32.37 | 30,384 |
| 1983 | 12,373.49 | 6,038 | 2,864 | 9,509 | 33.28 | 286 |
| 1984 | 195,768.00 | 92,765 | 43,994 | 151,774 | 34.20 | 4,438 |
| 1988 | 65,388.47 | 27,232 | 12,915 | 52,473 | 37.93 | 1,383 |
| 1998 | 22,751.29 | 6,090 | 2,888 | 19,863 | 47.60 | 417 |
| 1999 | 22,847.30 | 5,772 | 2,737 | 20,110 | 48.58 | 414 |
| 2003 | 135,012.07 | 25,880 | 12,273 | 122,739 | 52.54 | 2,336 |
| 2008 | 207,322.36 | 23,890 | 11,330 | 195,992 | 57.51 | 3,408 |
| 2015 | 293,863.07 | 2,410 | 1,143 | 292,720 | 60.48 | 4,840 |
| | 3,114,097.12 | 1,356,234 | 643,196 | 2,470,901 | | 72,339 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 34.2 2.32

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S12 - STORAGE PALLETS AND RACKINGS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 30-R3 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1984 | 10,706.05 | 8,786 | 10,706 | | | |
| 1998 | 3,696.62 | 1,957 | 3,697 | | | |
| | 14,402.67 | 10,743 | 14,403 | | | |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 0.0 | 0.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S13 - STORM AND YARD DRAINAGE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1967 | 3,047.17 | 2,400 | 3,047 | | | |
| 1969 | 105,766.52 | 80,768 | 105,767 | | | |
| 1980 | 260,474.54 | 160,025 | 260,475 | | | |
| 1983 | 237,980.07 | 135,304 | 225,246 | 12,734 | 23.73 | 537 |
| 1985 | 374,229.91 | 200,928 | 334,492 | 39,738 | 25.47 | 1,560 |
| 1987 | 5,660.27 | 2,856 | 4,755 | 905 | 27.25 | 33 |
| 1988 | 963.97 | 470 | 782 | 182 | 28.16 | 6 |
| 1989 | 3,287.74 | 1,549 | 2,579 | 709 | 29.08 | 24 |
| 1990 | 36,594.92 | 16,634 | 27,691 | 8,904 | 30.00 | 297 |
| 1991 | 30,419.95 | 13,313 | 22,163 | 8,257 | 30.93 | 267 |
| 1992 | 39,856.38 | 16,762 | 27,904 | 11,952 | 31.87 | 375 |
| 1995 | 31,748.63 | 11,701 | 19,479 | 12,270 | 34.73 | 353 |
| 2009 | 67,290.58 | 7,940 | 13,218 | 54,073 | 48.51 | 1,115 |
| 2013 | 75,014.75 | 3,409 | 5,675 | 69,340 | 52.50 | 1,321 |
| 2014 | 36,378.00 | 992 | 1,652 | 34,726 | 53.50 | 649 |
| | 1,308,713.40 | 655,051 | 1,054,925 | 253,788 | | 6,537 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 38.8 0.50

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S14 - STREET LIGHTS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 20-R2 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1981 | 54,255.98 | 55,527 | 57,511 | | | |
| 1982 | 7,797.99 | 7,869 | 8,266 | | | |
| 1983 | 1,970.32 | 1,958 | 2,073 | 16 | 1.25 | 13 |
| 1984 | 14,870.88 | 14,557 | 15,414 | 349 | 1.53 | 228 |
| 1986 | 10,258.60 | 9,727 | 10,299 | 575 | 2.11 | 273 |
| 1987 | 15,938.15 | 14,859 | 15,734 | 1,160 | 2.41 | 481 |
| 1988 | 29,761.78 | 27,273 | 28,878 | 2,669 | 2.71 | 985 |
| 1989 | 40,088.51 | 36,099 | 38,224 | 4,270 | 3.01 | 1,419 |
| 1990 | 64,177.85 | 56,668 | 60,003 | 8,026 | 3.34 | 2,403 |
| 1991 | 15,698.78 | 13,579 | 14,378 | 2,263 | 3.68 | 615 |
| 1992 | 33,394.44 | 28,230 | 29,892 | 5,506 | 4.05 | 1,360 |
| 1993 | 37,254.73 | 30,723 | 32,531 | 6,959 | 4.44 | 1,567 |
| 1994 | 35,848.17 | 28,784 | 30,478 | 7,521 | 4.85 | 1,551 |
| 1995 | 20,507.08 | 15,977 | 16,917 | 4,821 | 5.30 | 910 |
| 1996 | 43,177.00 | 32,564 | 34,481 | 11,287 | 5.77 | 1,956 |
| 1997 | 160,139.81 | 116,447 | 123,301 | 46,447 | 6.28 | 7,396 |
| 1998 | 78,991.65 | 55,221 | 58,471 | 25,260 | 6.81 | 3,709 |
| 1999 | 78,875.09 | 52,756 | 55,861 | 27,747 | 7.38 | 3,760 |
| 2000 | 102,207.84 | 65,167 | 69,003 | 39,337 | 7.97 | 4,936 |
| 2001 | 129,520.08 | 78,325 | 82,935 | 54,356 | 8.59 | 6,328 |
| 2002 | 113,267.13 | 64,594 | 68,396 | 51,667 | 9.24 | 5,592 |
| 2003 | 183,149.00 | 97,943 | 103,708 | 90,430 | 9.91 | 9,125 |
| 2004 | 197,169.97 | 98,230 | 104,011 | 104,989 | 10.60 | 9,905 |
| 2005 | 172,067.42 | 79,158 | 83,817 | 98,574 | 11.32 | 8,708 |
| 2006 | 195,791.12 | 82,393 | 87,242 | 120,297 | 12.06 | 9,975 |
| 2007 | 169,126.18 | 64,359 | 68,147 | 111,127 | 12.82 | 8,668 |
| 2008 | 218,006.97 | 73,948 | 78,300 | 152,787 | 13.60 | 11,234 |
| 2009 | 231,264.08 | 68,639 | 72,679 | 172,461 | 14.40 | 11,976 |
| 2010 | 189,899.06 | 48,109 | 50,941 | 150,352 | 15.22 | 9,879 |
| 2011 | 273,065.16 | 57,021 | 60,377 | 229,072 | 16.06 | 14,264 |
| 2012 | 188,079.80 | 30,802 | 32,615 | 166,750 | 16.91 | 9,861 |
| 2013 | 289,923.32 | 34,266 | 36,282 | 271,037 | 17.77 | 15,253 |
| 2014 | 193,673.80 | 13,857 | 14,673 | 190,621 | 18.65 | 10,221 |
| 2015 | 285,771.56 | 10,723 | 11,354 | 291,564 | 13.61 | 21,423 |
| | 3,874,989.30 | 1,566,352 | 1,657,192 | 2,450,297 | | 195,974 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 12.5 5.06

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S15 - STRUCTURAL SUPPORTS (WOOD OR STEEL)

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1967 | 213,565.83 | 178,306 | 219,728 | 6,652 | 11.68 | 570 |
| 1968 | 118,266.43 | 97,236 | 119,825 | 5,537 | 12.34 | 449 |
| 1970 | 625,023.62 | 497,735 | 613,364 | 49,161 | 13.68 | 3,594 |
| 1971 | 3,879.00 | 3,037 | 3,743 | 369 | 14.38 | 26 |
| 1974 | 40,813.35 | 30,260 | 37,290 | 5,972 | 16.53 | 361 |
| 1975 | 89,370.64 | 64,970 | 80,063 | 14,670 | 17.28 | 849 |
| 1976 | 86,734.84 | 61,783 | 76,136 | 15,803 | 18.04 | 876 |
| 1977 | 153,542.15 | 107,093 | 131,972 | 30,783 | 18.81 | 1,637 |
| 1978 | 840,408.57 | 573,376 | 706,577 | 184,256 | 19.60 | 9,401 |
| 1979 | 365,784.41 | 243,918 | 300,583 | 87,148 | 20.40 | 4,272 |
| 1980 | 253,554.46 | 165,120 | 203,479 | 65,289 | 21.21 | 3,078 |
| 1981 | 261,871.02 | 166,347 | 204,991 | 72,592 | 22.04 | 3,294 |
| 1982 | 674,886.46 | 417,782 | 514,837 | 200,543 | 22.88 | 8,765 |
| 1983 | 315,782.64 | 190,311 | 234,522 | 100,208 | 23.73 | 4,223 |
| 1984 | 14,166.81 | 8,300 | 10,228 | 4,789 | 24.60 | 195 |
| 1985 | 11,743.67 | 6,684 | 8,237 | 4,211 | 25.47 | 165 |
| 1986 | 75,722.14 | 41,797 | 51,507 | 28,758 | 26.36 | 1,091 |
| 1987 | 308,834.94 | 165,172 | 203,543 | 123,822 | 27.25 | 4,544 |
| 1988 | 79,011.14 | 40,871 | 50,366 | 33,386 | 28.16 | 1,186 |
| 1989 | 392,408.53 | 196,026 | 241,565 | 174,388 | 29.08 | 5,997 |
| 1990 | 895,903.74 | 431,667 | 531,948 | 417,710 | 30.00 | 13,924 |
| 1991 | 420,663.60 | 195,145 | 240,479 | 205,424 | 30.93 | 6,642 |
| 1992 | 611,539.56 | 272,614 | 335,945 | 312,287 | 31.87 | 9,799 |
| 1993 | 54,374.77 | 23,243 | 28,643 | 28,994 | 32.82 | 883 |
| 1994 | 168,570.90 | 68,972 | 84,995 | 93,690 | 33.77 | 2,774 |
| 1995 | 610,704.02 | 238,579 | 294,004 | 353,342 | 34.73 | 10,174 |
| 1996 | 278,697.88 | 103,666 | 127,749 | 167,671 | 35.70 | 4,697 |
| 1997 | 55,631.15 | 19,653 | 24,219 | 34,750 | 36.67 | 948 |
| 1998 | 197,201.80 | 65,979 | 81,307 | 127,727 | 37.64 | 3,393 |
| 1999 | 19,402.49 | 6,125 | 7,548 | 13,019 | 38.62 | 337 |
| 2000 | 304,743.10 | 90,448 | 111,460 | 211,568 | 39.60 | 5,343 |
| 2001 | 51,839.87 | 14,407 | 17,754 | 37,196 | 40.58 | 917 |
| 2002 | 95,124.17 | 24,639 | 30,363 | 70,469 | 41.56 | 1,696 |
| 2003 | 185,974.29 | 44,623 | 54,989 | 142,144 | 42.55 | 3,341 |
| 2004 | 14,790.11 | 3,267 | 4,026 | 11,652 | 43.54 | 268 |
| 2005 | 17,969.12 | 3,626 | 4,468 | 14,579 | 44.53 | 327 |
| 2006 | 18,876.25 | 3,445 | 4,245 | 15,764 | 45.53 | 346 |
| 2007 | 432,097.80 | 70,618 | 87,023 | 371,001 | 46.52 | 7,975 |
| 2008 | 33,346.06 | 4,807 | 5,924 | 29,423 | 47.52 | 619 |
| 2009 | 69,987.69 | 8,754 | 10,788 | 63,399 | 48.51 | 1,307 |
| 2010 | 226,254.53 | 23,940 | 29,502 | 210,328 | 49.51 | 4,248 |
| 2011 | 28,864.22 | 2,498 | 3,078 | 27,518 | 50.51 | 545 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S15 - STRUCTURAL SUPPORTS (WOOD OR STEEL)

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R4 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 2012 | 1,553,655.32 | 104,807 | 129,155 | 1,517,720 | 51.50 | 29,470 |
| 2014 | 308,262.78 | 8,911 | 10,981 | 315,778 | 53.50 | 5,902 |
| 2015 | 97,763.28 | 1,005 | 1,238 | 102,391 | 51.05 | 2,006 |
| | 11,677,609.15 | 5,091,562 | 6,274,387 | 6,103,879 | | 172,454 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 35.4 | 1.48 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S17 - SUMP SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 35-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1966 | 62,921.44 | 61,465 | 53,103 | 9,818 | 0.81 | 9,818 |
| 1979 | 54,056.59 | 47,153 | 40,739 | 13,318 | 4.47 | 2,979 |
| 1985 | 1,426.00 | 1,114 | 962 | 464 | 7.67 | 60 |
| 1988 | 21,760.44 | 15,711 | 13,574 | 8,186 | 9.73 | 841 |
| 1999 | 22,854.33 | 10,552 | 9,116 | 13,738 | 18.84 | 729 |
| 2009 | 75,619.94 | 14,000 | 12,096 | 63,524 | 28.52 | 2,227 |
| 2015 | 428,606.40 | 6,515 | 5,628 | 422,978 | 32.39 | 13,059 |
| | 667,245.14 | 156,510 | 135,218 | 532,027 | | 29,713 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 17.9 4.45

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S18 - SURGE SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 60-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1966 | 1,578,845.51 | 1,183,613 | 1,313,100 | 265,746 | 15.02 | 17,693 |
| 1967 | 2,334,768.00 | 1,723,059 | 1,911,562 | 423,206 | 15.72 | 26,922 |
| 2002 | 299,651.03 | 67,122 | 74,465 | 225,186 | 46.56 | 4,836 |
| 2014 | 1,496,950.24 | 37,424 | 41,518 | 1,455,432 | 58.50 | 24,879 |
| 2015 | 1,262,674.34 | 11,112 | 12,328 | 1,250,347 | 56.00 | 22,328 |
| | 6,972,889.12 | 3,022,330 | 3,352,973 | 3,619,917 | | 96,658 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 37.5 1.39

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S19 - STATION SWITCHING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 38-S0.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1965 | 95,998.62 | 73,818 | 87,581 | 8,418 | 8.78 | 959 |
| 1968 | 161,442.28 | 119,467 | 141,740 | 19,702 | 9.88 | 1,994 |
| 1970 | 1,000.00 | 720 | 854 | 146 | 10.64 | 14 |
| 1973 | 80,010.49 | 55,144 | 65,425 | 14,585 | 11.81 | 1,235 |
| 1980 | 256,525.40 | 157,088 | 186,375 | 70,150 | 14.73 | 4,762 |
| 1981 | 65,308.50 | 39,220 | 46,532 | 18,776 | 15.18 | 1,237 |
| 1982 | 123,205.18 | 72,528 | 86,050 | 37,155 | 15.63 | 2,377 |
| 1984 | 108,404.79 | 61,163 | 72,566 | 35,839 | 16.56 | 2,164 |
| 1985 | 2,461,120.55 | 1,358,145 | 1,611,358 | 849,763 | 17.03 | 49,898 |
| 1986 | 35,050.06 | 18,890 | 22,412 | 12,638 | 17.52 | 721 |
| 1987 | 50,537.58 | 26,585 | 31,542 | 18,996 | 18.01 | 1,055 |
| 1988 | 24,307.96 | 12,461 | 14,784 | 9,524 | 18.52 | 514 |
| 1989 | 125,368.04 | 62,585 | 74,253 | 51,115 | 19.03 | 2,686 |
| 1990 | 64,390.22 | 31,263 | 37,092 | 27,298 | 19.55 | 1,396 |
| 1991 | 66,301.23 | 31,249 | 37,075 | 29,226 | 20.09 | 1,455 |
| 1992 | 246,618.65 | 112,732 | 133,750 | 112,869 | 20.63 | 5,471 |
| 1994 | 309,425.68 | 132,239 | 156,894 | 152,532 | 21.76 | 7,010 |
| 1995 | 34,006.02 | 14,014 | 16,627 | 17,379 | 22.34 | 778 |
| 1996 | 146,348.10 | 58,001 | 68,815 | 77,533 | 22.94 | 3,380 |
| 1997 | 500,055.41 | 190,151 | 225,603 | 274,452 | 23.55 | 11,654 |
| 1998 | 224,915.13 | 81,858 | 97,120 | 127,795 | 24.17 | 5,287 |
| 1999 | 30,772.14 | 10,681 | 12,672 | 18,100 | 24.81 | 730 |
| 2000 | 411,071.49 | 135,654 | 160,945 | 250,126 | 25.46 | 9,824 |
| 2001 | 866,140.97 | 270,556 | 320,998 | 545,143 | 26.13 | 20,863 |
| 2002 | 815,476.44 | 240,133 | 284,903 | 530,573 | 26.81 | 19,790 |
| 2003 | 601,443.56 | 165,872 | 196,797 | 404,647 | 27.52 | 14,704 |
| 2004 | 8,687.61 | 2,231 | 2,647 | 6,041 | 28.24 | 214 |
| 2005 | 253,591.03 | 60,261 | 71,496 | 182,095 | 28.97 | 6,286 |
| 2006 | 143,720.54 | 31,278 | 37,109 | 106,612 | 29.73 | 3,586 |
| 2007 | 387,150.67 | 76,311 | 90,539 | 296,612 | 30.51 | 9,722 |
| 2008 | 903,906.47 | 159,377 | 189,091 | 714,815 | 31.30 | 22,838 |
| 2011 | 449,426.34 | 49,437 | 58,654 | 390,772 | 33.82 | 11,554 |
| 2012 | 60,152.93 | 5,224 | 6,198 | 53,955 | 34.70 | 1,555 |
| 2013 | 125,150.30 | 7,871 | 9,339 | 115,811 | 35.61 | 3,252 |
| 2014 | 1,413,001.86 | 53,920 | 63,973 | 1,349,029 | 36.55 | 36,909 |
| | 11,650,032.24 | 3,978,127 | 4,719,809 | 6,930,224 | | 267,874 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 25.9 2.30

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S20 - SWITCHING SYSTEMS - L.V.

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 60-R5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1967 | 11,423.00 | 8,935 | 3,623 | 7,800 | 13.07 | 597 |
| 1969 | 12,000.00 | 9,064 | 3,676 | 8,324 | 14.68 | 567 |
| 1970 | 5,070.00 | 3,759 | 1,524 | 3,546 | 15.51 | 229 |
| 1978 | 42,949.00 | 26,700 | 10,827 | 32,122 | 22.70 | 1,415 |
| 1980 | 292,893.12 | 172,710 | 70,037 | 222,856 | 24.62 | 9,052 |
| 1982 | 341,312.01 | 190,223 | 77,139 | 264,173 | 26.56 | 9,946 |
| 1983 | 57,955.20 | 31,354 | 12,715 | 45,240 | 27.54 | 1,643 |
| 1985 | 1,030,337.00 | 523,411 | 212,253 | 818,084 | 29.52 | 27,713 |
| 1989 | 13,381.22 | 5,910 | 2,397 | 10,984 | 33.50 | 328 |
| 2012 | 2,137.86 | 125 | 51 | 2,087 | 56.50 | 37 |
| 2014 | 149,698.41 | 3,742 | 1,517 | 148,181 | 58.50 | 2,533 |
| 2015 | 345,451.74 | 2,936 | 1,191 | 344,261 | 58.32 | 5,903 |
| | 2,304,608.56 | 978,869 | 396,950 | 1,907,659 | | 59,963 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 31.8 2.60

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T01 - TELECONTROL SYSTEM

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 25-L1.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1967 | 155,517.13 | 123,356 | 155,517 | | | |
| 1968 | 150,292.25 | 118,070 | 150,292 | | | |
| 1970 | 486,115.14 | 374,114 | 486,115 | | | |
| 1974 | 139,723.79 | 102,781 | 139,724 | | | |
| 1975 | 38,228.01 | 27,784 | 38,228 | | | |
| 1976 | 7,194.87 | 5,163 | 7,195 | | | |
| 1977 | 43,794.87 | 31,024 | 43,795 | | | |
| 1978 | 28,102.56 | 19,638 | 28,103 | | | |
| 1980 | 679,315.49 | 461,663 | 679,315 | | | |
| 1982 | 25,527.39 | 16,838 | 25,527 | | | |
| 1984 | 13,123.52 | 8,383 | 13,124 | | | |
| 1985 | 125,247.66 | 78,706 | 125,248 | | | |
| 1987 | 32,460.35 | 19,723 | 32,460 | | | |
| 1988 | 12,474.58 | 7,450 | 12,269 | 206 | 10.07 | 20 |
| 1989 | 25,171.86 | 14,771 | 24,326 | 846 | 10.33 | 82 |
| 1990 | 67,835.32 | 39,073 | 64,348 | 3,487 | 10.60 | 329 |
| 1991 | 9,093.53 | 5,140 | 8,465 | 629 | 10.87 | 58 |
| 1992 | 210,249.91 | 116,563 | 191,964 | 18,286 | 11.14 | 1,641 |
| 1993 | 9,515.51 | 5,169 | 8,513 | 1,003 | 11.42 | 88 |
| 1995 | 340,055.68 | 176,829 | 291,215 | 48,841 | 12.00 | 4,070 |
| 1996 | 150,823.71 | 76,558 | 126,081 | 24,743 | 12.31 | 2,010 |
| 1997 | 230,157.88 | 113,790 | 187,397 | 42,761 | 12.64 | 3,383 |
| 1998 | 120,918.27 | 58,089 | 95,665 | 25,253 | 12.99 | 1,944 |
| 1999 | 658,698.64 | 306,427 | 504,646 | 154,053 | 13.37 | 11,522 |
| 2000 | 232,641.59 | 104,503 | 172,103 | 60,539 | 13.77 | 4,396 |
| 2001 | 629,924.69 | 272,127 | 448,158 | 181,767 | 14.20 | 12,800 |
| 2002 | 287,577.81 | 118,712 | 195,503 | 92,075 | 14.68 | 6,272 |
| 2003 | 1,272,180.85 | 499,204 | 822,125 | 450,056 | 15.19 | 29,628 |
| 2004 | 185,243.03 | 68,540 | 112,877 | 72,366 | 15.75 | 4,595 |
| 2005 | 68,977.27 | 23,839 | 39,260 | 29,717 | 16.36 | 1,816 |
| 2006 | 116,763.42 | 37,318 | 61,458 | 55,305 | 17.01 | 3,251 |
| 2007 | 155,855.93 | 45,510 | 74,949 | 80,907 | 17.70 | 4,571 |
| 2008 | 681,121.71 | 178,726 | 294,339 | 386,783 | 18.44 | 20,975 |
| 2009 | 153,434.75 | 35,597 | 58,624 | 94,811 | 19.20 | 4,938 |
| 2010 | 775,458.93 | 154,782 | 254,906 | 520,553 | 20.01 | 26,015 |
| 2011 | 2,127,249.56 | 353,123 | 581,548 | 1,545,702 | 20.85 | 74,134 |
| 2012 | 785,805.63 | 103,098 | 169,789 | 616,017 | 21.72 | 28,362 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T01 - TELECONTROL SYSTEM

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 25-L1.5 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2013 | 308,556.04 | 29,375 | 48,377 | 260,179 | 22.62 | 11,502 |
| 2014 | 199,430.31 | 11,487 | 18,917 | 180,513 | 23.56 | 7,662 |
| 2015 | 689,419.53 | 19,580 | 32,246 | 657,174 | 17.14 | 38,342 |
| | 12,429,278.97 | 4,362,623 | 6,824,711 | 5,604,568 | | 304,406 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 18.4 | 2.45 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T02 - TEST EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 20-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1996 | 171,525.07 | 167,237 | 171,525 | | | |
| 1997 | 44,520.05 | 41,181 | 44,520 | | | |
| 1998 | 62,092.77 | 54,331 | 62,093 | | | |
| 1999 | 66,647.04 | 54,984 | 66,647 | | | |
| 2000 | 21,555.00 | 16,705 | 21,555 | | | |
| 2001 | 129,850.59 | 94,142 | 129,851 | | | |
| 2003 | 35,528.41 | 22,205 | 32,293 | 3,235 | 7.50 | 431 |
| 2004 | 56,187.58 | 32,308 | 46,985 | 9,203 | 8.50 | 1,083 |
| 2005 | 104,172.87 | 54,691 | 79,537 | 24,636 | 9.50 | 2,593 |
| 2006 | 125,767.44 | 59,740 | 86,880 | 38,887 | 10.50 | 3,704 |
| 2007 | 111,117.86 | 47,225 | 68,679 | 42,439 | 11.50 | 3,690 |
| 2008 | 118,554.56 | 44,458 | 64,655 | 53,900 | 12.50 | 4,312 |
| 2009 | 245,322.20 | 79,730 | 115,952 | 129,370 | 13.50 | 9,583 |
| 2010 | 143,454.99 | 39,450 | 57,372 | 86,083 | 14.50 | 5,937 |
| 2011 | 82,921.77 | 18,657 | 27,133 | 55,789 | 15.50 | 3,599 |
| 2012 | 51,402.18 | 8,995 | 13,081 | 38,321 | 16.50 | 2,322 |
| 2013 | 40,726.65 | 5,091 | 7,404 | 33,323 | 17.50 | 1,904 |
| 2014 | 279,396.00 | 20,955 | 30,475 | 248,921 | 18.50 | 13,455 |
| 2015 | 64,570.87 | 1,614 | 2,347 | 62,224 | 19.50 | 3,191 |
| | 1,955,313.90 | 863,699 | 1,128,984 | 826,330 | | 55,804 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 14.8 2.85

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T03 - TOOLS AND EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 20-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1996 | 200,248.76 | 195,243 | 200,249 | | | |
| 1997 | 488,362.83 | 451,736 | 488,363 | | | |
| 1998 | 244,471.89 | 213,913 | 244,472 | | | |
| 1999 | 673,202.49 | 555,392 | 673,202 | | | |
| 2000 | 323,762.71 | 250,916 | 323,763 | | | |
| 2001 | 211,193.15 | 153,115 | 204,742 | 6,451 | 5.50 | 1,173 |
| 2002 | 183,918.34 | 124,145 | 166,004 | 17,914 | 6.50 | 2,756 |
| 2003 | 326,809.44 | 204,256 | 273,126 | 53,683 | 7.50 | 7,158 |
| 2004 | 172,231.32 | 99,033 | 132,425 | 39,806 | 8.50 | 4,683 |
| 2005 | 452,386.88 | 237,503 | 317,583 | 134,804 | 9.50 | 14,190 |
| 2006 | 1,130,061.14 | 536,779 | 717,768 | 412,293 | 10.50 | 39,266 |
| 2007 | 613,104.06 | 260,569 | 348,427 | 264,677 | 11.50 | 23,015 |
| 2008 | 619,700.32 | 232,388 | 310,744 | 308,956 | 12.50 | 24,716 |
| 2009 | 1,999,143.86 | 649,722 | 868,793 | 1,130,351 | 13.50 | 83,730 |
| 2010 | 479,417.85 | 131,840 | 176,293 | 303,125 | 14.50 | 20,905 |
| 2011 | 790,951.91 | 177,964 | 237,969 | 552,983 | 15.50 | 35,676 |
| 2012 | 479,101.79 | 83,843 | 112,113 | 366,989 | 16.50 | 22,242 |
| 2013 | 817,875.96 | 102,234 | 136,705 | 681,171 | 17.50 | 38,924 |
| 2014 | 667,366.06 | 50,052 | 66,929 | 600,437 | 18.50 | 32,456 |
| 2015 | 561,016.93 | 14,025 | 18,754 | 542,263 | 19.50 | 27,808 |
| | 11,434,327.69 | 4,724,668 | 6,018,424 | 5,415,904 | | 378,698 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 14.3 3.31

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T04 - TOWERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-R4 | | | | | | |
| NET SALVAGE PERCENT.. -20 | | | | | | |
| 1967 | 7,774,613.38 | 6,467,514 | 5,053,292 | 4,276,244 | 19.94 | 214,456 |
| 1968 | 3,671,739.67 | 3,003,586 | 2,346,805 | 2,059,283 | 20.69 | 99,530 |
| 1970 | 647,368.87 | 511,162 | 399,389 | 377,454 | 22.23 | 16,979 |
| 1974 | 328,024.10 | 239,570 | 187,184 | 206,445 | 25.44 | 8,115 |
| 1976 | 67,922.93 | 47,500 | 37,113 | 44,395 | 27.12 | 1,637 |
| 1977 | 4,145,457.94 | 2,833,951 | 2,214,264 | 2,760,286 | 27.97 | 98,687 |
| 1981 | 133,177.73 | 82,440 | 64,413 | 95,400 | 31.47 | 3,031 |
| 1982 | 27,740.73 | 16,711 | 13,057 | 20,232 | 32.37 | 625 |
| 1983 | 5,228,146.18 | 3,061,602 | 2,392,135 | 3,881,640 | 33.28 | 116,636 |
| 1984 | 325,719.13 | 185,210 | 144,711 | 246,152 | 34.20 | 7,197 |
| 1985 | 14,909,454.99 | 8,224,473 | 6,426,065 | 11,465,281 | 35.12 | 326,460 |
| 1988 | 505,215.54 | 252,482 | 197,273 | 408,986 | 37.93 | 10,783 |
| 1989 | 692,670.62 | 334,020 | 260,981 | 570,224 | 38.88 | 14,666 |
| 1990 | 3,967,744.87 | 1,843,716 | 1,440,559 | 3,320,735 | 39.83 | 83,373 |
| 1991 | 1,445,942.58 | 646,267 | 504,951 | 1,230,180 | 40.79 | 30,159 |
| 1993 | 131,812.19 | 54,218 | 42,362 | 115,813 | 42.72 | 2,711 |
| 1996 | 28,732.47 | 10,270 | 8,024 | 26,455 | 45.64 | 580 |
| 1999 | 811,245.78 | 245,924 | 192,149 | 781,346 | 48.58 | 16,084 |
| 2000 | 7,662,860.96 | 2,182,812 | 1,705,506 | 7,489,927 | 49.57 | 151,098 |
| 2001 | 4,060,773.88 | 1,082,521 | 845,811 | 4,027,118 | 50.56 | 79,650 |
| 2002 | 7,597,273.00 | 1,886,433 | 1,473,935 | 7,642,793 | 51.55 | 148,260 |
| 2003 | 4,195,002.97 | 964,968 | 753,963 | 4,280,041 | 52.54 | 81,463 |
| 2004 | 2,053,137.11 | 434,756 | 339,690 | 2,124,075 | 53.53 | 39,680 |
| 2007 | 1,498,132.33 | 234,536 | 183,251 | 1,614,508 | 56.52 | 28,565 |
| 2010 | 102,678.68 | 10,407 | 8,131 | 115,083 | 59.51 | 1,934 |
| 2011 | 173,482.90 | 14,381 | 11,236 | 196,943 | 60.51 | 3,255 |
| 2012 | 5,527,731.64 | 357,202 | 279,095 | 6,354,183 | 61.50 | 103,320 |
| 2013 | 25,620.47 | 1,182 | 924 | 29,821 | 62.50 | 477 |
| | 77,739,423.64 | 35,229,814 | 27,526,269 | 65,761,040 | | 1,689,411 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 38.9 2.17

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T05 - TRANSFORMERS - OTHER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

SURVIVOR CURVE.. IOWA 55-R3
NET SALVAGE PERCENT.. -6

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| 1964 | 10,236.25 | 8,315 | 8,068 | 2,782 | 12.85 | 216 |
| 1965 | 2,170,497.40 | 1,740,615 | 1,689,003 | 611,724 | 13.39 | 45,685 |
| 1966 | 295,436.32 | 233,791 | 226,859 | 86,303 | 13.94 | 6,191 |
| 1967 | 2,550,570.08 | 1,990,339 | 1,931,322 | 772,282 | 14.51 | 53,224 |
| 1968 | 1,087,469.18 | 836,239 | 811,443 | 341,274 | 15.10 | 22,601 |
| 1969 | 1,581,634.14 | 1,197,648 | 1,162,136 | 514,396 | 15.71 | 32,743 |
| 1970 | 8,182,128.19 | 6,099,500 | 5,918,638 | 2,754,418 | 16.32 | 168,776 |
| 1971 | 2,339,157.03 | 1,714,926 | 1,664,075 | 815,431 | 16.96 | 48,080 |
| 1972 | 837,143.10 | 603,253 | 585,365 | 302,007 | 17.61 | 17,150 |
| 1973 | 30,493.88 | 21,586 | 20,946 | 11,378 | 18.27 | 623 |
| 1974 | 1,198,626.20 | 833,019 | 808,318 | 462,226 | 18.94 | 24,405 |
| 1975 | 330,460.22 | 225,267 | 218,587 | 131,701 | 19.63 | 6,709 |
| 1976 | 266,952.78 | 178,373 | 173,084 | 109,886 | 20.33 | 5,405 |
| 1977 | 3,621,685.19 | 2,370,382 | 2,300,096 | 1,538,890 | 21.04 | 73,141 |
| 1978 | 5,401,385.00 | 3,459,213 | 3,356,641 | 2,368,827 | 21.77 | 108,812 |
| 1979 | 169,874.23 | 106,403 | 103,248 | 76,819 | 22.50 | 3,414 |
| 1980 | 3,269,811.65 | 2,000,818 | 1,941,490 | 1,524,510 | 23.25 | 65,570 |
| 1981 | 1,156,129.07 | 690,506 | 670,031 | 555,466 | 24.01 | 23,135 |
| 1982 | 1,022,219.43 | 595,564 | 577,904 | 505,649 | 24.77 | 20,414 |
| 1983 | 300,416.84 | 170,510 | 165,454 | 152,988 | 25.55 | 5,988 |
| 1984 | 61,963.44 | 34,226 | 33,211 | 32,470 | 26.34 | 1,233 |
| 1985 | 3,302,469.71 | 1,773,238 | 1,720,658 | 1,779,960 | 27.14 | 65,584 |
| 1986 | 1,351,098.86 | 704,625 | 683,732 | 748,433 | 27.94 | 26,787 |
| 1987 | 391,909.57 | 198,195 | 192,318 | 223,106 | 28.76 | 7,758 |
| 1988 | 1,710,691.01 | 837,760 | 812,919 | 1,000,413 | 29.59 | 33,809 |
| 1989 | 4,722,409.22 | 2,237,121 | 2,170,787 | 2,834,967 | 30.42 | 93,194 |
| 1990 | 3,182,456.02 | 1,456,096 | 1,412,920 | 1,960,483 | 31.26 | 62,715 |
| 1991 | 487,312.18 | 214,978 | 208,604 | 307,947 | 32.11 | 9,590 |
| 1992 | 457,250.18 | 194,141 | 188,384 | 296,301 | 32.97 | 8,987 |
| 1993 | 637,973.44 | 260,174 | 252,459 | 423,793 | 33.84 | 12,523 |
| 1994 | 224,276.70 | 87,659 | 85,060 | 152,673 | 34.72 | 4,397 |
| 1995 | 2,821,265.16 | 1,054,854 | 1,023,576 | 1,966,965 | 35.60 | 55,252 |
| 1996 | 2,130,805.18 | 760,150 | 737,610 | 1,521,043 | 36.49 | 41,684 |
| 1997 | 104,738.09 | 35,547 | 34,493 | 76,529 | 37.39 | 2,047 |
| 1998 | 2,072,130.48 | 666,933 | 647,157 | 1,549,301 | 38.30 | 40,452 |
| 1999 | 196,003.17 | 59,647 | 57,878 | 149,885 | 39.21 | 3,823 |
| 2000 | 179,015.54 | 51,303 | 49,782 | 139,974 | 40.13 | 3,488 |
| 2001 | 96,325.48 | 25,879 | 25,112 | 76,993 | 41.06 | 1,875 |
| 2002 | 2,417,735.37 | 606,230 | 588,254 | 1,974,545 | 41.99 | 47,024 |
| 2003 | 1,253,034.95 | 291,477 | 282,834 | 1,045,383 | 42.93 | 24,351 |
| 2004 | 1,163,248.70 | 249,519 | 242,120 | 990,924 | 43.87 | 22,588 |
| 2005 | 546,492.29 | 107,324 | 104,142 | 475,140 | 44.81 | 10,603 |
| 2006 | 182,214.29 | 32,414 | 31,453 | 161,694 | 45.77 | 3,533 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T05 - TRANSFORMERS - OTHER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R3 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 2007 | 1,673,348.41 | 267,038 | 259,120 | 1,514,629 | 46.72 | 32,419 |
| 2008 | 96,028.90 | 13,529 | 13,128 | 88,663 | 47.69 | 1,859 |
| 2009 | 3,649,480.13 | 446,612 | 433,369 | 3,435,080 | 48.65 | 70,608 |
| 2010 | 1,107,821.46 | 114,869 | 111,463 | 1,062,828 | 49.62 | 21,419 |
| 2011 | 1,330,021.46 | 113,040 | 109,688 | 1,300,135 | 50.59 | 25,699 |
| 2012 | 4,236,924.35 | 280,067 | 271,763 | 4,219,377 | 51.57 | 81,818 |
| 2013 | 3,130,464.89 | 148,427 | 144,026 | 3,174,267 | 52.54 | 60,416 |
| 2014 | 770,965.88 | 21,991 | 21,339 | 795,885 | 53.52 | 14,871 |
| 2015 | 7,745,073.72 | 88,666 | 86,037 | 8,123,741 | 46.01 | 176,565 |
| | 89,255,274.41 | 38,509,996 | 37,368,104 | 57,242,487 | | 1,801,253 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 31.8 2.02

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T06 - TRANSFORMERS - PAD MOUNT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 40-R1.5 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1967 | 85,000.00 | 70,388 | 91,800 | | | |
| 1968 | 110,241.68 | 90,189 | 118,150 | 911 | 9.70 | 94 |
| 1970 | 78,787.71 | 62,818 | 82,293 | 2,798 | 10.47 | 267 |
| 1974 | 23,978.75 | 18,018 | 23,604 | 2,293 | 12.17 | 188 |
| 1981 | 67,676.80 | 44,512 | 58,312 | 14,779 | 15.64 | 945 |
| 1982 | 127,293.37 | 81,833 | 107,204 | 30,273 | 16.19 | 1,870 |
| 1983 | 70,647.20 | 44,349 | 58,099 | 18,200 | 16.75 | 1,087 |
| 1984 | 14,234.01 | 8,716 | 11,418 | 3,955 | 17.32 | 228 |
| 1985 | 27,018.49 | 16,122 | 21,120 | 8,060 | 17.90 | 450 |
| 1987 | 47,938.17 | 27,039 | 35,422 | 16,351 | 19.11 | 856 |
| 1989 | 63,969.03 | 33,939 | 44,461 | 24,626 | 20.35 | 1,210 |
| 1991 | 82,079.46 | 40,666 | 53,274 | 35,372 | 21.65 | 1,634 |
| 1992 | 93,133.80 | 44,483 | 58,274 | 42,311 | 22.31 | 1,897 |
| 1993 | 33,003.74 | 15,167 | 19,869 | 15,775 | 22.98 | 686 |
| 1994 | 139,248.04 | 61,433 | 80,479 | 69,909 | 23.66 | 2,955 |
| 1995 | 10,265.00 | 4,337 | 5,682 | 5,404 | 24.35 | 222 |
| 1996 | 156,420.31 | 63,181 | 82,769 | 86,165 | 25.04 | 3,441 |
| 1997 | 72,427.27 | 27,866 | 36,505 | 41,716 | 25.75 | 1,620 |
| 1998 | 742.00 | 271 | 355 | 446 | 26.46 | 17 |
| 1999 | 45,687.77 | 15,814 | 20,717 | 28,626 | 27.18 | 1,053 |
| 2000 | 41,970.99 | 13,701 | 17,949 | 27,380 | 27.91 | 981 |
| 2001 | 356,142.61 | 109,140 | 142,977 | 241,657 | 28.65 | 8,435 |
| 2002 | 93,388.29 | 26,753 | 35,047 | 65,812 | 29.39 | 2,239 |
| 2003 | 30,705.67 | 8,174 | 10,708 | 22,454 | 30.14 | 745 |
| 2004 | 70,225.32 | 17,273 | 22,628 | 53,215 | 30.89 | 1,723 |
| 2005 | 66,295.63 | 14,946 | 19,580 | 52,019 | 31.65 | 1,644 |
| 2006 | 99,363.64 | 20,336 | 26,641 | 80,672 | 32.42 | 2,488 |
| 2007 | 98,472.00 | 18,106 | 23,719 | 82,631 | 33.19 | 2,490 |
| 2008 | 310,577.85 | 50,565 | 66,242 | 269,182 | 33.97 | 7,924 |
| 2009 | 132,056.82 | 18,683 | 24,475 | 118,146 | 34.76 | 3,399 |
| 2010 | 179,576.76 | 21,576 | 28,265 | 165,678 | 35.55 | 4,660 |
| 2011 | 153,567.38 | 15,176 | 19,881 | 145,972 | 36.34 | 4,017 |
| 2012 | 1,706,848.53 | 131,342 | 172,062 | 1,671,334 | 37.15 | 44,989 |
| 2013 | 171,473.68 | 9,491 | 12,433 | 172,759 | 37.95 | 4,552 |
| 2014 | 12,549,805.40 | 416,779 | 545,993 | 13,007,797 | 38.77 | 335,512 |
| 2015 | 313,388.75 | 7,378 | 9,666 | 328,794 | 22.49 | 14,620 |
| | 17,723,651.92 | 1,670,560 | 2,188,073 | 16,953,472 | | 461,138 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 36.8 2.60

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T07 - TRANSFORMERS - POLE MOUNTED

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 30-L1 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1967 | 12,694.59 | 9,602 | 11,784 | 1,926 | 8.99 | 214 |
| 1968 | 3,506.89 | 2,622 | 3,218 | 569 | 9.23 | 62 |
| 1970 | 43,296.14 | 31,610 | 38,792 | 7,968 | 9.72 | 820 |
| 1971 | 311.65 | 225 | 276 | 61 | 9.97 | 6 |
| 1978 | 10,884.00 | 7,123 | 8,741 | 3,014 | 11.82 | 255 |
| 1979 | 323.10 | 208 | 255 | 94 | 12.11 | 8 |
| 1981 | 428,000.05 | 266,865 | 327,501 | 134,739 | 12.68 | 10,626 |
| 1982 | 130,758.66 | 80,118 | 98,322 | 42,897 | 12.98 | 3,305 |
| 1983 | 218,005.26 | 131,221 | 161,036 | 74,410 | 13.28 | 5,603 |
| 1984 | 155,589.64 | 91,972 | 112,869 | 55,168 | 13.58 | 4,062 |
| 1985 | 151,605.75 | 87,925 | 107,903 | 55,831 | 13.89 | 4,020 |
| 1986 | 175,088.19 | 99,527 | 122,141 | 66,954 | 14.21 | 4,712 |
| 1987 | 459,057.33 | 255,660 | 313,750 | 182,032 | 14.53 | 12,528 |
| 1988 | 162,746.89 | 88,762 | 108,930 | 66,837 | 14.85 | 4,501 |
| 1989 | 248,635.14 | 132,563 | 162,683 | 105,843 | 15.19 | 6,968 |
| 1990 | 270,942.21 | 141,238 | 173,329 | 119,289 | 15.52 | 7,686 |
| 1991 | 271,811.17 | 138,265 | 169,681 | 123,875 | 15.87 | 7,806 |
| 1992 | 867,575.72 | 430,384 | 528,174 | 408,808 | 16.22 | 25,204 |
| 1993 | 301,034.54 | 145,545 | 178,615 | 146,502 | 16.57 | 8,841 |
| 1994 | 282,360.08 | 132,753 | 162,917 | 142,032 | 16.94 | 8,384 |
| 1995 | 583,381.91 | 266,720 | 327,323 | 302,729 | 17.30 | 17,499 |
| 1996 | 895,423.58 | 397,141 | 487,378 | 479,679 | 17.68 | 27,131 |
| 1997 | 1,130,944.07 | 486,125 | 596,580 | 624,840 | 18.06 | 34,598 |
| 1998 | 604,436.78 | 251,325 | 308,430 | 344,362 | 18.45 | 18,665 |
| 1999 | 685,159.47 | 274,774 | 337,207 | 402,765 | 18.86 | 21,356 |
| 2000 | 687,281.02 | 265,485 | 325,807 | 416,457 | 19.27 | 21,612 |
| 2001 | 627,766.65 | 232,550 | 285,389 | 392,599 | 19.71 | 19,919 |
| 2002 | 818,683.48 | 289,418 | 355,178 | 529,000 | 20.18 | 26,214 |
| 2003 | 983,095.61 | 329,852 | 404,800 | 656,943 | 20.68 | 31,767 |
| 2004 | 800,656.38 | 253,360 | 310,927 | 553,782 | 21.21 | 26,109 |
| 2005 | 1,021,524.86 | 302,290 | 370,975 | 732,272 | 21.78 | 33,621 |
| 2006 | 999,114.89 | 274,077 | 336,352 | 742,692 | 22.38 | 33,186 |
| 2007 | 1,308,207.61 | 328,251 | 402,835 | 1,010,029 | 23.03 | 43,857 |
| 2008 | 1,065,933.24 | 241,374 | 296,218 | 854,990 | 23.71 | 36,060 |
| 2009 | 1,712,109.10 | 342,690 | 420,555 | 1,428,523 | 24.44 | 58,450 |
| 2010 | 2,361,337.29 | 408,039 | 500,752 | 2,049,492 | 25.20 | 81,329 |
| 2011 | 3,802,181.60 | 547,500 | 671,900 | 3,434,456 | 26.00 | 132,094 |
| 2012 | 3,507,262.82 | 398,974 | 489,627 | 3,298,217 | 26.84 | 122,884 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T07 - TRANSFORMERS - POLE MOUNTED

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 30-L1 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 2013 | 3,553,161.54 | 292,910 | 359,464 | 3,477,950 | 27.71 | 125,512 |
| 2014 | 3,281,651.61 | 164,202 | 201,511 | 3,342,673 | 28.61 | 116,836 |
| 2015 | 2,416,916.21 | 68,911 | 84,569 | 2,525,700 | 18.44 | 136,969 |
| | 37,040,456.72 | 8,690,156 | 10,664,694 | 29,338,999 | | 1,281,279 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 22.9 | 3.46 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T09 - TURBINES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R2.5 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1967 | 1,762,788.78 | 1,408,172 | 1,210,723 | 798,856 | 16.46 | 48,533 |
| 1968 | 8,607,404.86 | 6,775,982 | 5,825,876 | 3,986,566 | 17.02 | 234,228 |
| 1970 | 1,683,339.64 | 1,283,989 | 1,103,952 | 815,055 | 18.20 | 44,783 |
| 1971 | 26,000.00 | 19,508 | 16,773 | 12,867 | 18.80 | 684 |
| 1975 | 101,873.10 | 71,033 | 61,073 | 55,062 | 21.36 | 2,578 |
| 1977 | 217,905.93 | 145,841 | 125,392 | 123,021 | 22.71 | 5,417 |
| 1978 | 4,242,670.89 | 2,778,894 | 2,389,246 | 2,447,399 | 23.40 | 104,590 |
| 1980 | 2,788,239.51 | 1,744,762 | 1,500,117 | 1,678,476 | 24.81 | 67,653 |
| 1982 | 7,091,357.09 | 4,224,371 | 3,632,043 | 4,452,104 | 26.26 | 169,539 |
| 1983 | 46,776.00 | 27,147 | 23,341 | 29,984 | 27.00 | 1,111 |
| 1985 | 10,927,015.21 | 6,001,934 | 5,160,362 | 7,296,435 | 28.50 | 256,015 |
| 1987 | 8,893.22 | 4,599 | 3,954 | 6,184 | 30.05 | 206 |
| 1988 | 6,909,835.55 | 3,461,641 | 2,976,261 | 4,900,952 | 30.83 | 158,967 |
| 1989 | 1,587,174.93 | 769,149 | 661,302 | 1,148,077 | 31.62 | 36,309 |
| 2003 | 11,929,596.94 | 2,848,466 | 2,449,063 | 11,150,678 | 43.48 | 256,455 |
| 2006 | 305,590.00 | 55,865 | 48,032 | 300,341 | 46.18 | 6,504 |
| 2009 | 67,170.20 | 8,451 | 7,266 | 69,308 | 48.93 | 1,416 |
| 2013 | 2,448,806.00 | 119,287 | 102,561 | 2,689,078 | 52.65 | 51,075 |
| 2014 | 289,550.40 | 8,523 | 7,328 | 322,759 | 53.58 | 6,024 |
| 2015 | 4,117,648.02 | 57,268 | 49,238 | 4,644,881 | 40.32 | 115,200 |
| | 65,159,636.27 | 31,814,882 | 27,353,903 | 46,928,082 | | 1,567,287 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 29.9 2.41

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T10.00 - HOLYROOD GAS TURBINE - COMBUSTOR OVERHAUL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 3-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2015 | 2,206,062.36 | 367,684 | 40,444 | 2,165,618 | 2.50 | 866,247 |
| | 2,206,062.36 | 367,684 | 40,444 | 2,165,618 | | 866,247 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 2.5 39.27

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T11.00 - HOLYROOD GAS TURBINE - TURBINE OVERHAUL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 6-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2015 | 2,206,062.35 | 183,831 | 40,444 | 2,165,618 | 5.50 | 393,749 |
| | 2,206,062.35 | 183,831 | 40,444 | 2,165,618 | | 393,749 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.5 17.85

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T12.00 - HOLYROOD GAS TURBINE - COMPRESSOR OVERHAUL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. 12-SQUARE | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2015 | 3,088,487.29 | 128,697 | 56,622 | 3,031,865 | 11.50 | 263,640 |
| | 3,088,487.29 | 128,697 | 56,622 | 3,031,865 | | 263,640 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 11.5 8.54

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT V01 - VACUUM CLEANING SYSTEM

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 60-R4 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1969 | 23,574.00 | 16,840 | 23,574 | | | |
| 1980 | 48,877.00 | 27,819 | 43,406 | 5,471 | 25.85 | 212 |
| | 72,451.00 | 44,659 | 66,980 | 5,471 | | 212 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 25.8 0.29

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT V02 - VALVES - PENSTOCK

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-R3 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1967 | 1,415,205.48 | 993,245 | 804,476 | 723,946 | 22.76 | 31,808 |
| 1970 | 547,228.00 | 364,875 | 295,530 | 295,476 | 24.87 | 11,881 |
| 1975 | 14,300.75 | 8,654 | 7,009 | 8,436 | 28.58 | 295 |
| 1977 | 104,000.00 | 60,255 | 48,803 | 63,517 | 30.13 | 2,108 |
| 1982 | 22,218.67 | 11,393 | 9,228 | 14,768 | 34.14 | 433 |
| 1985 | 2,204,894.06 | 1,038,979 | 841,518 | 1,539,768 | 36.64 | 42,024 |
| 1988 | 2,432.20 | 1,042 | 844 | 1,783 | 39.21 | 45 |
| 2001 | 194,935.91 | 45,378 | 36,754 | 173,777 | 50.99 | 3,408 |
| 2003 | 236,497.01 | 47,625 | 38,574 | 216,843 | 52.88 | 4,101 |
| 2004 | 211,351.90 | 39,226 | 31,771 | 196,489 | 53.83 | 3,650 |
| 2005 | 212,317.84 | 36,053 | 29,201 | 200,102 | 54.78 | 3,653 |
| 2006 | 176,897.79 | 27,217 | 22,044 | 169,006 | 55.74 | 3,032 |
| 2007 | 129,795.39 | 17,878 | 14,480 | 125,699 | 56.71 | 2,217 |
| 2008 | 1,875,177.71 | 228,381 | 184,977 | 1,840,215 | 57.67 | 31,909 |
| 2015 | 220,507.28 | 2,167 | 1,755 | 236,393 | 54.45 | 4,341 |
| | 7,567,759.99 | 2,922,368 | 2,366,964 | 5,806,217 | | 144,905 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 40.1 1.91

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT V03 - VEHICLES - 1 TON

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 8-L4 | | | | | | |
| NET SALVAGE PERCENT.. +15 | | | | | | |
| 2013 | 51,647.92 | 13,719 | 16,140 | 27,761 | 5.50 | 5,047 |
| | 51,647.92 | 13,719 | 16,140 | 27,761 | | 5,047 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.5 9.77

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT V04 - VEHICLES - 3/4 TON AND UNDER

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 7-L3 | | | | | | |
| NET SALVAGE PERCENT.. +15 | | | | | | |
| 2004 | 21,073.00 | 15,174 | 17,912 | | | |
| 2007 | 256,097.59 | 161,085 | 217,683 | | | |
| 2008 | 75,904.47 | 45,901 | 64,519 | | | |
| 2009 | 452,574.79 | 264,335 | 384,689 | | | |
| 2010 | 817,731.47 | 450,803 | 695,072 | | | |
| 2011 | 720,937.71 | 354,546 | 612,797 | | | |
| 2012 | 750,380.31 | 302,513 | 637,823 | | | |
| 2013 | 282,039.93 | 83,564 | 183,264 | 56,470 | 4.56 | 12,384 |
| 2014 | 718,833.74 | 130,059 | 285,232 | 325,777 | 5.51 | 59,125 |
| 2015 | 1,071,596.79 | 73,779 | 161,805 | 749,052 | 5.67 | 132,108 |
| | 5,167,169.80 | 1,881,759 | 3,260,796 | 1,131,298 | | 203,617 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.6 3.94

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT V05 - VEHICLES - BOOMS/BODIES/CRANES/CAB/CHASSIS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 12-L3 | | | | | | |
| NET SALVAGE PERCENT.. +15 | | | | | | |
| 2000 | 23,000.00 | 14,825 | 19,137 | 413 | 2.90 | 142 |
| 2002 | 130,045.00 | 79,772 | 102,972 | 7,566 | 3.34 | 2,265 |
| 2003 | 202,565.49 | 121,675 | 157,062 | 15,119 | 3.52 | 4,295 |
| 2004 | 466,287.00 | 274,468 | 354,293 | 42,051 | 3.69 | 11,396 |
| 2005 | 634,697.00 | 364,157 | 470,066 | 69,426 | 3.90 | 17,802 |
| 2006 | 313,439.36 | 173,396 | 223,825 | 42,598 | 4.19 | 10,167 |
| 2007 | 1,464,993.85 | 765,826 | 988,554 | 256,691 | 4.62 | 55,561 |
| 2008 | 610,927.99 | 294,265 | 379,847 | 139,442 | 5.20 | 26,816 |
| 2009 | 1,838,387.86 | 793,035 | 1,023,677 | 538,953 | 5.91 | 91,193 |
| 2010 | 746,610.15 | 278,705 | 359,762 | 274,857 | 6.73 | 40,841 |
| 2011 | 1,663,998.12 | 516,255 | 666,399 | 747,999 | 7.62 | 98,163 |
| 2012 | 1,991,867.42 | 488,168 | 630,144 | 1,062,943 | 8.54 | 124,466 |
| 2013 | 1,322,985.14 | 233,342 | 301,206 | 823,331 | 9.51 | 86,575 |
| 2014 | 976,501.08 | 103,753 | 133,928 | 696,098 | 10.50 | 66,295 |
| 2015 | 2,568,240.80 | 103,038 | 133,005 | 2,050,000 | 10.09 | 203,171 |
| | 14,954,546.26 | 4,604,680 | 5,943,877 | 6,767,488 | | 839,148 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 8.1 5.61

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT V06 - VEHICLES - CARS, STATION WAGONS AND VANS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 6-L3 | | | | | | |
| NET SALVAGE PERCENT.. +15 | | | | | | |
| 2006 | 21,051.00 | 14,911 | 17,893 | | | |
| 2007 | 31,861.28 | 21,395 | 27,082 | | | |
| 2008 | 238,285.56 | 151,569 | 202,543 | | | |
| 2009 | 236,872.66 | 143,623 | 201,342 | | | |
| 2010 | 286,725.00 | 166,946 | 243,716 | | | |
| 2011 | 280,782.15 | 151,552 | 238,665 | | | |
| 2012 | 203,510.02 | 93,122 | 172,984 | | | |
| 2013 | 276,271.38 | 94,714 | 234,831 | | | |
| 2014 | 220,013.03 | 46,440 | 177,625 | 9,386 | 4.51 | 2,081 |
| | 1,795,372.08 | 884,272 | 1,516,681 | 9,385 | | 2,081 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 4.5 0.12

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT V07 - VEHICLES - DUMP TRUCKS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 10-L5 | | | | | | |
| NET SALVAGE PERCENT.. +15 | | | | | | |
| 2003 | 11,535.00 | 8,814 | 11,535 | 1,730- | | |
| | 11,535.00 | 8,814 | 11,535 | 1,730- | | |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 0.0 | 0.00 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W01 - WATER REGULATING STRUCTURES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 65-S4 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1966 | 781,460.65 | 617,530 | 407,033 | 436,945 | 17.44 | 25,054 |
| 1967 | 2,271,900.00 | 1,767,390 | 1,164,940 | 1,288,712 | 18.18 | 70,886 |
| 1979 | 1,923,424.16 | 1,161,999 | 765,909 | 1,311,389 | 28.64 | 45,789 |
| 1980 | 22,093.09 | 12,995 | 8,565 | 15,296 | 29.60 | 517 |
| 1983 | 1,760,835.28 | 949,672 | 625,957 | 1,275,745 | 32.54 | 39,205 |
| 1985 | 5,067.02 | 2,566 | 1,691 | 3,781 | 34.52 | 110 |
| 1999 | 50,969.18 | 13,974 | 9,211 | 45,836 | 48.50 | 945 |
| 2003 | 15,340,515.10 | 3,186,145 | 2,100,085 | 14,467,671 | 52.50 | 275,575 |
| 2010 | 295,473.83 | 27,003 | 17,798 | 301,314 | 59.50 | 5,064 |
| | 22,451,738.31 | 7,739,274 | 5,101,189 | 19,146,688 | | 463,145 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 41.3 2.06

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W02 - WATER SUPPLY SYSTEMS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 30-L4 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1966 | 36,616.00 | 36,461 | 34,844 | 4,701 | 2.34 | 2,009 |
| 1967 | 10,039.39 | 9,939 | 9,498 | 1,345 | 2.50 | 538 |
| 1968 | 7,289.13 | 7,174 | 6,856 | 1,016 | 2.66 | 382 |
| 1969 | 31,622.36 | 30,931 | 29,560 | 4,592 | 2.83 | 1,623 |
| 1970 | 5,778.10 | 5,616 | 5,367 | 873 | 3.00 | 291 |
| 1971 | 9,746.00 | 9,410 | 8,993 | 1,533 | 3.18 | 482 |
| 1976 | 13,007.24 | 12,086 | 11,550 | 2,498 | 4.19 | 596 |
| 1977 | 32,252.39 | 29,701 | 28,384 | 6,449 | 4.42 | 1,459 |
| 1978 | 52,656.72 | 48,073 | 45,942 | 10,927 | 4.64 | 2,355 |
| 1979 | 166,185.56 | 150,464 | 143,793 | 35,687 | 4.85 | 7,358 |
| 1980 | 15,467.03 | 13,887 | 13,271 | 3,433 | 5.06 | 678 |
| 1981 | 16,651.69 | 14,843 | 14,185 | 3,799 | 5.24 | 725 |
| 1982 | 72,242.09 | 63,978 | 61,141 | 16,880 | 5.40 | 3,126 |
| 1985 | 326,739.18 | 284,303 | 271,698 | 81,180 | 5.83 | 13,925 |
| 1986 | 10,359.04 | 8,954 | 8,557 | 2,631 | 5.99 | 439 |
| 1987 | 40,022.75 | 34,291 | 32,771 | 10,454 | 6.20 | 1,686 |
| 1988 | 93,343.70 | 79,069 | 75,563 | 25,248 | 6.47 | 3,902 |
| 1989 | 135,698.19 | 113,238 | 108,217 | 38,337 | 6.82 | 5,621 |
| 1990 | 44,904.42 | 36,777 | 35,146 | 13,351 | 7.25 | 1,842 |
| 1991 | 28,308.25 | 22,655 | 21,651 | 8,922 | 7.77 | 1,148 |
| 1992 | 90,973.91 | 70,840 | 67,699 | 30,553 | 8.37 | 3,650 |
| 1993 | 18,883.67 | 14,249 | 13,617 | 6,777 | 9.04 | 750 |
| 1995 | 139,943.07 | 98,139 | 93,788 | 57,351 | 10.52 | 5,452 |
| 1996 | 39,359.32 | 26,483 | 25,309 | 17,199 | 11.31 | 1,521 |
| 1999 | 18,116.97 | 10,540 | 10,073 | 9,493 | 13.84 | 686 |
| 2003 | 1,242,574.09 | 556,922 | 532,230 | 809,750 | 17.55 | 46,140 |
| 2005 | 38,828.51 | 14,663 | 14,013 | 27,922 | 19.51 | 1,431 |
| 2006 | 25,217.49 | 8,624 | 8,242 | 18,993 | 20.50 | 926 |
| 2007 | 53,657.88 | 16,419 | 15,691 | 42,260 | 21.50 | 1,966 |
| 2008 | 54,235.70 | 14,644 | 13,995 | 44,580 | 22.50 | 1,981 |
| 2011 | 9,250.00 | 1,498 | 1,432 | 8,558 | 25.50 | 336 |
| 2013 | 269,116.45 | 24,220 | 23,146 | 267,500 | 27.50 | 9,727 |
| 2015 | 245,467.25 | 4,666 | 4,459 | 260,646 | 27.83 | 9,366 |
| | 3,394,553.54 | 1,873,757 | 1,790,681 | 1,875,437 | | 134,117 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 14.0 3.95

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W03 - WATER SYSTEMS - FEED

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R2.5 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1968 | 329,755.00 | 245,929 | 354,161 | 1,974 | 17.02 | 116 |
| 1971 | 1,732,845.00 | 1,231,766 | 1,773,858 | 97,615 | 18.80 | 5,192 |
| 1980 | 1,646,391.76 | 976,019 | 1,405,559 | 372,544 | 24.81 | 15,016 |
| 2013 | 170,885.85 | 7,886 | 11,357 | 173,200 | 52.65 | 3,290 |
| 2015 | 2,651,382.05 | 34,935 | 50,310 | 2,813,183 | 40.32 | 69,771 |
| | 6,531,259.66 | 2,496,535 | 3,595,245 | 3,458,516 | | 93,385 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 37.0 1.43

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W04 - WATER TREATMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| SURVIVOR CURVE.. IOWA 55-R2.5 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1968 | 65,708.12 | 48,097 | 69,651 | | | |
| 1969 | 1,663,202.51 | 1,198,836 | 1,762,995 | | | |
| 1971 | 204,537.00 | 142,699 | 216,809 | | | |
| 1988 | 57,541.66 | 26,804 | 57,967 | 3,027 | 30.83 | 98 |
| 1990 | 15,137.27 | 6,587 | 14,245 | 1,801 | 32.42 | 56 |
| 1991 | 2,681,164.08 | 1,124,934 | 2,432,817 | 409,217 | 33.23 | 12,315 |
| 1995 | 5,359.72 | 1,907 | 4,124 | 1,557 | 36.54 | 43 |
| 1997 | 2,409,124.70 | 778,640 | 1,683,911 | 869,761 | 38.23 | 22,751 |
| 2012 | 659,794.84 | 41,837 | 90,478 | 608,905 | 51.71 | 11,775 |
| 2015 | 4,160,003.20 | 53,797 | 116,343 | 4,293,261 | 40.32 | 106,480 |
| | 11,921,573.10 | 3,424,138 | 6,449,340 | 6,187,528 | | 153,518 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 40.3 1.29

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT A04.1 - AUXILIARY POWER SYSTEMS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 30-R4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 2010 | 620,866.42 | 327,484 | 313,020 | 326,472 | 5.24 | 62,304 |
| | 620,866.42 | 327,484 | 313,020 | 326,472 | | 62,304 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 10.04

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B01.1 - BATTERY AND POWER SYSTEMS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 26-L1.5 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1968 | 62,070.09 | 54,810 | 35,509 | 28,423 | 3.69 | 7,703 |
| 2013 | 44,556.86 | 14,837 | 9,612 | 36,282 | 5.17 | 7,018 |
| | 106,626.95 | 69,647 | 45,121 | 64,705 | | 14,721 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 4.4 13.81

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B02.1 - BOILER SYSTEM - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 40-R3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1976 | 6,373.00 | 6,092 | 5,908 | 975 | 4.34 | 225 |
| 1979 | 20,390.00 | 19,269 | 18,687 | 3,334 | 4.56 | 731 |
| 1980 | 17,650,550.81 | 16,614,958 | 16,113,472 | 2,949,123 | 4.62 | 638,338 |
| 1983 | 2,205,577.30 | 2,048,993 | 1,987,149 | 394,874 | 4.79 | 82,437 |
| 1984 | 88,778.32 | 82,106 | 79,628 | 16,253 | 4.83 | 3,365 |
| 1985 | 36,723.56 | 33,799 | 32,779 | 6,882 | 4.87 | 1,413 |
| 1986 | 2,072.08 | 1,897 | 1,840 | 398 | 4.91 | 81 |
| 1987 | 138,230.21 | 125,891 | 122,091 | 27,198 | 4.94 | 5,506 |
| 1989 | 42,488.95 | 38,240 | 37,086 | 8,802 | 5.00 | 1,760 |
| 1992 | 164,446.23 | 144,982 | 140,606 | 36,996 | 5.06 | 7,311 |
| 1996 | 9,711.53 | 8,252 | 8,003 | 2,485 | 5.13 | 484 |
| 1997 | 955,842.08 | 803,209 | 778,966 | 253,343 | 5.14 | 49,289 |
| 1999 | 181,052.03 | 148,189 | 143,716 | 51,820 | 5.16 | 10,043 |
| 2001 | 408,654.76 | 323,746 | 313,974 | 127,373 | 5.18 | 24,589 |
| 2007 | 3,620,559.38 | 2,414,864 | 2,341,977 | 1,568,227 | 5.22 | 300,427 |
| 2008 | 4,217,954.40 | 2,678,570 | 2,597,723 | 1,957,668 | 5.22 | 375,032 |
| 2009 | 1,322,059.11 | 789,030 | 765,215 | 662,609 | 5.23 | 126,694 |
| 2010 | 1,357,501.38 | 749,486 | 726,864 | 739,237 | 5.23 | 141,346 |
| 2011 | 714,762.78 | 356,159 | 345,409 | 426,535 | 5.23 | 81,555 |
| 2012 | 1,376,773.06 | 593,398 | 575,488 | 911,427 | 5.24 | 173,936 |
| 2013 | 82,687.17 | 28,766 | 27,898 | 61,404 | 5.24 | 11,718 |
| 2014 | 376,808.77 | 90,567 | 87,833 | 319,120 | 5.24 | 60,901 |
| 2015 | 93,433.07 | 8,819 | 8,553 | 92,355 | 5.22 | 17,693 |
| | 35,073,429.98 | 28,109,282 | 27,260,865 | 10,618,440 | | 2,114,874 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.0 6.03

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B05.1 - BUILDINGS - OTHER - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 50-R0.5 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 2004 | 119,618.36 | 82,847 | 82,613 | 40,594 | 5.12 | 7,929 |
| 2006 | 594,079.01 | 385,908 | 384,816 | 227,085 | 5.13 | 44,266 |
| 2008 | 113,363.32 | 67,301 | 67,111 | 49,653 | 5.13 | 9,679 |
| 2010 | 176,461.62 | 91,230 | 90,972 | 90,783 | 5.13 | 17,696 |
| 2011 | 296,727.90 | 138,154 | 137,762 | 167,867 | 5.14 | 32,659 |
| | 1,300,250.21 | 765,440 | 763,274 | 575,983 | | 112,229 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.1 8.63

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT B06.1 - BUILDINGS - METAL - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 55-R3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 2009 | 72,011.04 | 40,981 | 39,551 | 34,620 | 5.24 | 6,607 |
| | 72,011.04 | 40,981 | 39,551 | 34,620 | | 6,607 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 9.17

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C01.1 - CABLES - TELECONTROL - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 30-R4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 2004 | 89,749.79 | 63,572 | 63,121 | 29,321 | 5.20 | 5,639 |
| | 89,749.79 | 63,572 | 63,121 | 29,321 | | 5,639 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 6.28

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C03.1 - CABLES - UNDERGROUND - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 60-S4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1980 | 544,049.00 | 540,859 | 481,561 | 138,655 | 5.20 | 26,664 |
| | 544,049.00 | 540,859 | 481,561 | 138,655 | | 26,664 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 4.90

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C04.1 - CABLES - ABOVE GROUND - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 60-R4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1980 | 629,827.19 | 625,747 | 560,583 | 157,420 | 5.16 | 30,508 |
| | 629,827.19 | 625,747 | 560,583 | 157,420 | | 30,508 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 4.84

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C07.1 - CHEMICAL FEED SYSTEMS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 45-R4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1987 | 8,841.21 | 7,929 | 8,054 | 1,318 | 5.08 | 259 |
| 1995 | 68,322.84 | 57,694 | 58,602 | 13,820 | 5.20 | 2,658 |
| | 77,164.05 | 65,623 | 66,656 | 15,138 | | 2,917 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 3.78

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C12.1 - CONDENSERS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 55-R3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -3 | | | | | | |
| 1980 | 2,042,518.00 | 1,828,512 | 1,896,994 | 206,800 | 5.09 | 40,629 |
| 1997 | 51,553.63 | 41,313 | 42,860 | 10,240 | 5.21 | 1,965 |
| 2008 | 235,595.08 | 142,620 | 147,962 | 94,701 | 5.24 | 18,073 |
| | 2,329,666.71 | 2,012,445 | 2,087,816 | 311,741 | | 60,667 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.1 2.60

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT C15.1 - CONTROL, METER, RELAYING - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 40-R3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2012 | 119,879.96 | 47,842 | 48,437 | 71,443 | 5.24 | 13,634 |
| | 119,879.96 | 47,842 | 48,437 | 71,443 | | 13,634 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 11.37

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT E03.1 - ENVIRONMENTAL EQUIPMENT - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 45-R2.5 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2000 | 263,583.82 | 196,222 | 199,368 | 64,216 | 5.17 | 12,421 |
| 2001 | 2,680.00 | 1,960 | 1,991 | 689 | 5.18 | 133 |
| 2003 | 815,776.03 | 572,593 | 581,775 | 234,001 | 5.19 | 45,087 |
| 2008 | 150,049.97 | 88,006 | 89,418 | 60,632 | 5.21 | 11,638 |
| 2014 | 48,171.15 | 10,681 | 10,852 | 37,319 | 5.23 | 7,136 |
| | 1,280,260.97 | 869,462 | 883,404 | 396,857 | | 76,415 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 5.97

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F03.1 - FIRE FIGHTING EQUIPMENT - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 50-R4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1968 | 76,937.47 | 69,733 | 60,373 | 16,564 | 4.43 | 3,739 |
| 1980 | 506,992.00 | 442,315 | 382,942 | 124,050 | 5.03 | 24,662 |
| 2009 | 213,220.13 | 117,951 | 102,118 | 111,102 | 5.25 | 21,162 |
| | 797,149.60 | 629,999 | 545,433 | 251,716 | | 49,563 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.1 6.22

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F04.1 - FOOTINGS AND FOUNDATIONS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 65-R3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1987 | 56,612.79 | 51,569 | 46,927 | 14,214 | 5.19 | 2,739 |
| | 56,612.79 | 51,569 | 46,927 | 14,214 | | 2,739 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 4.84

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT F06.1 - FUEL SYSTEMS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 50-R1.5 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -11 | | | | | | |
| 1980 | 4,294,944.43 | 4,097,952 | 3,707,897 | 1,059,491 | 5.02 | 211,054 |
| 1991 | 76,747.60 | 69,343 | 62,743 | 22,447 | 5.11 | 4,393 |
| 1992 | 37,066.15 | 33,239 | 30,075 | 11,068 | 5.12 | 2,162 |
| 1995 | 37,257.20 | 32,563 | 29,464 | 11,891 | 5.13 | 2,318 |
| 2001 | 712,705.67 | 574,776 | 520,067 | 271,036 | 5.16 | 52,526 |
| 2008 | 775,913.22 | 501,764 | 454,005 | 407,259 | 5.18 | 78,621 |
| 2010 | 2,366,125.59 | 1,330,665 | 1,204,008 | 1,422,391 | 5.19 | 274,064 |
| 2012 | 3,379,559.02 | 1,487,432 | 1,345,853 | 2,405,458 | 5.19 | 463,479 |
| 2013 | 1,628,833.20 | 578,182 | 523,149 | 1,284,856 | 5.19 | 247,564 |
| | 13,309,152.08 | 8,705,916 | 7,877,261 | 6,895,898 | | 1,336,181 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 10.04

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G01.1 - GAS TURBINE SYSTEMS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 45-R3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -2 | | | | | | |
| 1987 | 24,645.16 | 21,192 | 23,906 | 1,232 | 5.05 | 244 |
| | 24,645.16 | 21,192 | 23,906 | 1,232 | | 244 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 5.0 | 0.99 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G03.1 - GENERATORS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 65-S3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1987 | 846.63 | 772 | 687 | 227 | 5.22 | 43 |
| 2008 | 78,948.91 | 50,156 | 44,661 | 40,604 | 5.25 | 7,734 |
| 2012 | 210,136.55 | 90,779 | 80,832 | 146,115 | 5.25 | 27,831 |
| 2013 | 777,505.62 | 270,872 | 241,193 | 598,513 | 5.25 | 114,002 |
| | 1,067,437.71 | 412,579 | 367,373 | 785,459 | | 149,610 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.3 14.02

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT G06.1 - GOVENORS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 45-S4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1980 | 218,343.00 | 218,755 | 198,381 | 50,530 | 4.76 | 10,616 |
| 1999 | 922,781.05 | 798,046 | 723,721 | 328,249 | 5.25 | 62,524 |
| 2003 | 1,003,258.64 | 805,438 | 730,424 | 413,291 | 5.25 | 78,722 |
| | 2,144,382.69 | 1,822,239 | 1,652,526 | 792,071 | | 151,862 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 7.08

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT I02.1 - INSTUMENTATION - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 30-L0.5 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1980 | 2,307,659.57 | 1,912,819 | 1,881,919 | 425,741 | 4.57 | 93,160 |
| 1987 | 470,718.02 | 380,957 | 374,803 | 95,915 | 4.67 | 20,539 |
| 1988 | 112,204.97 | 90,369 | 88,909 | 23,296 | 4.69 | 4,967 |
| 1989 | 32,021.39 | 25,668 | 25,253 | 6,768 | 4.70 | 1,440 |
| 1994 | 655,548.30 | 509,086 | 500,862 | 154,686 | 4.77 | 32,429 |
| 2004 | 1,639,203.46 | 1,104,413 | 1,086,572 | 552,631 | 4.91 | 112,552 |
| 2005 | 1,156,534.93 | 757,808 | 745,567 | 410,968 | 4.93 | 83,361 |
| 2008 | 344,737.06 | 200,178 | 196,944 | 147,793 | 4.99 | 29,618 |
| 2014 | 8,698.00 | 1,930 | 1,899 | 6,799 | 5.12 | 1,328 |
| | 6,727,325.70 | 4,983,228 | 4,902,728 | 1,824,598 | | 379,394 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 4.8 5.64

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT I05.1 - INVERTERS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 25-S1.5 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 2000 | 18,910.94 | 15,304 | 14,372 | 6,052 | 4.74 | 1,277 |
| 2008 | 5,505.60 | 3,512 | 3,298 | 2,648 | 5.10 | 519 |
| | 24,416.54 | 18,816 | 17,670 | 8,700 | | 1,796 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 4.8 7.36

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT L03.1 - LAND IMPROVEMENTS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 75-R3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1989 | 5,765.52 | 4,807 | 4,965 | 801 | 5.22 | 153 |
| | 5,765.52 | 4,807 | 4,965 | 801 | | 153 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 2.65

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M02.1 - MARINE TERMINAL - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 65-R4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1996 | 346,931.75 | 289,763 | 288,055 | 79,693 | 5.24 | 15,209 |
| 2009 | 121,591.12 | 71,299 | 70,879 | 58,008 | 5.25 | 11,049 |
| | 468,522.87 | 361,062 | 358,934 | 137,700 | | 26,258 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 5.60

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT M10.1 - MISCELLANEOUS UNITS OF PROPERTY - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 22-R1.5 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2011 | 174,380.59 | 78,989 | 81,721 | 92,660 | 5.06 | 18,312 |
| 2014 | 1,437,566.30 | 314,813 | 325,701 | 1,111,866 | 5.10 | 218,013 |
| | 1,611,946.89 | 393,802 | 407,422 | 1,204,525 | | 236,325 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 5.1 | 14.66 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT O02.1 - OFFICE FURNITURE - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. SQUARE | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 1998 | 58,975.29 | 51,603 | 48,674 | 10,302 | 2.50 | 4,121 |
| | 58,975.29 | 51,603 | 48,674 | 10,302 | | 4,121 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 2.5 6.99

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P10.1 - POWERHOUSE - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 75-R3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1980 | 8,874,021.38 | 8,338,606 | 7,826,979 | 1,756,964 | 5.19 | 338,529 |
| 1987 | 29,410.44 | 26,797 | 25,153 | 6,610 | 5.21 | 1,269 |
| | 8,903,431.82 | 8,365,403 | 7,852,132 | 1,763,575 | | 339,798 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 3.82

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT P12.1 - PROTECTIVE CONTROL AND RELAY PANELS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 35-R3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2008 | 106,685.08 | 62,746 | 65,531 | 41,154 | 5.21 | 7,899 |
| | 106,685.08 | 62,746 | 65,531 | 41,154 | | 7,899 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 7.40

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT R13.1 - ROADS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 60-R4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1980 | 1,859.00 | 1,750 | 1,635 | 373 | 5.16 | 72 |
| | 1,859.00 | 1,750 | 1,635 | 373 | | 72 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 3.87

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S07.1 - STACKS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 55-R4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1968 | 2,511,250.83 | 2,447,065 | 2,153,213 | 558,938 | 4.81 | 116,203 |
| 1980 | 1,698,208.00 | 1,599,121 | 1,407,093 | 426,972 | 5.11 | 83,556 |
| 1992 | 511,777.49 | 451,876 | 397,613 | 155,107 | 5.22 | 29,714 |
| 2005 | 2,016,821.65 | 1,451,640 | 1,277,322 | 900,845 | 5.25 | 171,590 |
| 2011 | 261,850.00 | 130,523 | 114,849 | 167,949 | 5.25 | 31,990 |
| 2012 | 2,182,691.48 | 942,923 | 829,695 | 1,527,612 | 5.25 | 290,974 |
| 2014 | 19,519.33 | 4,685 | 4,122 | 16,959 | 5.25 | 3,230 |
| | 9,202,118.78 | 7,027,833 | 6,183,907 | 3,754,381 | | 727,257 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 5.2 | 7.90 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT S08.1 - STATIC EXCITATION SYSTEM - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 32-R4 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1968 | 1,115,787.92 | 1,172,386 | 813,916 | 368,819 | 0.28 | 368,819 |
| 2000 | 329,058.01 | 261,217 | 181,347 | 167,454 | 5.15 | 32,515 |
| 2001 | 16,588.65 | 12,936 | 8,981 | 8,603 | 5.17 | 1,664 |
| | 1,461,434.58 | 1,446,539 | 1,004,244 | 544,877 | | 402,998 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 1.4 27.58

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T03.1 - TOOLS AND EQUIPMENT - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. SQUARE | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. 0 | | | | | | |
| 2001 | 30,649.10 | 22,502 | 22,162 | 8,487 | 5.25 | 1,617 |
| 2010 | 320,612.40 | 164,035 | 161,554 | 159,059 | 5.25 | 30,297 |
| | 351,261.50 | 186,537 | 183,716 | 167,546 | | 31,914 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 9.09

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T05.1 - TRANSFORMERS - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 55-R3 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 2013 | 126,690.40 | 43,376 | 38,007 | 96,285 | 5.24 | 18,375 |
| | 126,690.40 | 43,376 | 38,007 | 96,285 | | 18,375 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 14.50

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT T09.1 - TURBINES - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 55-R2.5 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -14 | | | | | | |
| 1980 | 6,398,098.00 | 6,322,366 | 5,612,011 | 1,681,821 | 5.08 | 331,067 |
| 1995 | 1,579.76 | 1,429 | 1,268 | 533 | 5.18 | 103 |
| 2006 | 611,180.01 | 447,464 | 397,189 | 299,556 | 5.22 | 57,386 |
| 2007 | 1,705,004.00 | 1,198,760 | 1,064,072 | 879,633 | 5.22 | 168,512 |
| 2009 | 988,302.25 | 622,279 | 552,362 | 574,303 | 5.22 | 110,020 |
| 2010 | 430,013.25 | 249,931 | 221,850 | 268,365 | 5.23 | 51,313 |
| 2012 | 1,691,863.26 | 769,272 | 682,840 | 1,245,884 | 5.23 | 238,219 |
| 2013 | 10,126,535.70 | 3,713,324 | 3,296,111 | 8,248,140 | 5.23 | 1,577,082 |
| 2014 | 5,124,796.25 | 1,295,406 | 1,149,860 | 4,692,408 | 5.23 | 897,210 |
| | 27,077,372.48 | 14,620,231 | 12,977,563 | 17,890,642 | | 3,430,912 |
| COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. | | | | | 5.2 | 12.67 |

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W03.1 - WATER SYSTEMS - FEED - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 55-R2.5 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -8 | | | | | | |
| 1979 | 1,107,382.84 | 1,040,222 | 887,011 | 308,962 | 5.07 | 60,939 |
| 1980 | 1,024,814.00 | 959,385 | 818,080 | 288,719 | 5.08 | 56,834 |
| 2014 | 95,600.00 | 22,893 | 19,521 | 83,727 | 5.23 | 16,009 |
| 2015 | 590,837.65 | 56,153 | 47,882 | 590,222 | 5.18 | 113,942 |
| | 2,818,634.49 | 2,078,653 | 1,772,494 | 1,271,631 | | 247,724 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.1 8.79

NEWFOUNDLAND AND LABRADOR HYDRO

ACCOUNT W04.1 - WATER TREATMENT - HOLYROOD

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2015

| YEAR (1) | ORIGINAL COST (2) | CALCULATED ACCRUED (3) | ALLOC. BOOK RESERVE (4) | FUTURE BOOK ACCRUALS (5) | REM. LIFE (6) | ANNUAL ACCRUAL (7) |
|---|---|---|---|---|---|---|
| INTERIM SURVIVOR CURVE.. IOWA 55-R2.5 | | | | | | |
| PROBABLE RETIREMENT YEAR.. 3-2021 | | | | | | |
| NET SALVAGE PERCENT.. -6 | | | | | | |
| 1969 | 177,015.88 | 167,637 | 157,358 | 30,279 | 4.90 | 6,179 |
| 1979 | 5,098.00 | 4,700 | 4,412 | 992 | 5.07 | 196 |
| 1980 | 622,363.00 | 571,839 | 536,775 | 122,930 | 5.08 | 24,199 |
| 1983 | 18,823.46 | 17,097 | 16,049 | 3,904 | 5.11 | 764 |
| 1995 | 9,354.00 | 7,867 | 7,385 | 2,530 | 5.18 | 488 |
| 1996 | 224,794.62 | 187,073 | 175,602 | 62,680 | 5.19 | 12,077 |
| 2011 | 1,418,153.65 | 691,898 | 649,473 | 853,770 | 5.23 | 163,245 |
| 2013 | 317,359.44 | 108,207 | 101,572 | 234,829 | 5.23 | 44,900 |
| | 2,792,962.05 | 1,756,318 | 1,648,626 | 1,311,914 | | 252,048 |

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 5.2 9.02

# APPENDIX I

# ADDITIONAL EVIDENCE OF LARRY KENNEDY

# NEWFOUNDLAND AND LABRADOR HYDRO

IN THE MATTER OF

AN APPLICATION BY NEWFOUNDLAND AND LABRADOR HYDRO BEFORE THE NEWFOUNDLAND AND LABRADOR BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

# EVIDENCE

# OF

# LARRY E. KENNEDY RELATED TO

# THE CONVERSION TO GROUP ACCOUNTING METHODS

**JULY, 2017**

CONCENTRIC ADVISORS

# DEPRECIATION EVIDENCE OF
# LARRY KENNEDY

## Introduction and Overview

**Q1. Please state your name and business address.**

A1. My name is Larry Kennedy and my business address is Suite 277, 200 Rivercrest Drive S.E., Calgary, Alberta, T2C 2X5.

**Q2. Please state your occupation.**

A2. I am Vice President of Concentric Advisors ULC.

**Q3. Have you previously testified before this or any other regulatory boards?**

A3. Yes, I have testified on numerous occasions before regulatory boards throughout Canada as summarized in my Curriculum Vitae, attached to this evidence. Also, as summarized in my Curriculum Vitae, I have prepared a number of additional depreciation reviews that have resulted in negotiated settlements or where appearances were not required.

Of specific note, I have presented expert reports and testimony on depreciation-related matters on behalf of Newfoundland and Labrador Hydro ("NL Hydro") to the Newfoundland and Labrador Board of Commissioners of Public Utilities ("PUB") on three (3) prior occasions.

**Q4. Please state the purpose of this evidence.**

A4. Concentric Advisors was retained by NL Hydro to complete a full and complete depreciation study for inclusion as part of a regulatory application to the PUB. Additionally, Concentric Advisors was asked to provide a response to a PUB directive resulting from the last depreciation study and negotiated settlement application relating to the historical NL Hydro departure from the use of typical regulated group depreciation accounting. This evidence discusses the issues and

concepts related to Group Depreciation and provides a recommendation to convert to group depreciation accounting. This recommendation was used in the development of the depreciation rates that are determined in the Concentric Advisors Depreciation Study.

**Q5. Please summarize the PUB Directive.**

A5. In PUB Order No P.U. 40(2012), the Board directed as follows:

> *"In accordance with the terms of the Settlement Agreement Hydro has agreed to provide, at the time of its next depreciation study, a report, on a limited number of groups of property, comparing the agreed methodology to the application of depreciation on a pure group basis. The Board notes that the findings of this report would not be applied retroactively but rather would provide information for future rate making purposes. In the Board's view this is a reasonable approach to resolve what appears to have been a difference in expert opinion on this specific issue. The Board will accept this recommendation."*[1]

**Q6. Please describe the current NLHydro accounting practices.**

A6. At present, the current NL Hydro practice would be described as a "Hybrid Unit Depreciation" practice. Within the current accounting system (JD Edwards), each asset is ascribed with a life estimate. The accounting system then prepares the depreciation expense entries utilizing a remaining life calculation on each asset, with the associated depreciation expense tracked against each specific asset. At the time of retirement of the asset, the original cost of the asset is removed from the gross plant in service ledger. Additionally the accumulated depreciation expense associated with the specific asset is removed from the accumulated depreciation account. The difference between the original cost and the accumulated depreciation expense is booked as a loss to the income statement on the period of the retirement transactions. As the current system will not allow for the over depreciation of an asset, the entry to the income statement is virtually always a loss, absent any net salvage considerations.

[1] Order No. P.U. 40(2012), page 3, lines 28-35.

Currently, the annual charges to the income statement (as described above) are large enough to warrant inclusion in the revenue requirement. As such, the retirement entries need to be forecast for all test periods, and the associated gain and loss for each forecast retirement transaction requires estimation and inclusion in the each test year's revenue requirement. To the extent that the current practice of estimating the forecast losses, there exists for the potential of material over or under statement of the company's net income.

While the above discussion describes a unit depreciation process, there are some aspects of a more traditional grouping process in the current NL Hydro practices. Average service life estimates and retirement dispersion curves are developed on the basis of combining all of the average age and retirement characteristics of the overall UOP grouping rather than on each individual asset. The same depreciation rate is then applied to all assets within the UOP grouping. In this manner the depreciation rate does recognize a weighted probability of retirement dispersion providing for potential retirement of the asset either prior to or later than the average service life estimate.

**Q7. Please outline the concept of Group Depreciation Accounting**

A7. Group depreciation refers to the widely accepted procedure for rate regulated utilities where, rather than depreciating each item by itself (unit depreciation), a group containing homogenous units of plant which are alike in character, used in the same manner throughout the utilities service territory, and operated under the same general conditions is formed. Group depreciation recognizes that there will be differing lives for individual units within the group. For example, poles are often combined into a single group. Some poles will be retired due to storms or third party damage (for example automobile accidents, for strikes by farm equipment, etc.). Others will decay, while some will be displaced due to road relocations, and some will be replaced due to the need to provide underground service. However they are combined into the same group because they are homogenous units. With group depreciation, the entire group is considered as the asset being depreciated,

therefore, one depreciation rate is applied to the entire group and only one accumulated depreciation account is tracked for the entire group.

Under group depreciation no gain or loss is recognized for retirement of individual assets, as only one depreciation calculation is made on the entire group. Upon retirement of an asset from the group, the total original cost of the asset is debited to the accumulated depreciation account and credited to the asset account. Any gross salvage received (if applicable) for the retired asset is credited to the accumulated depreciation account and any cost of removal is debited to the accumulated depreciation account and any cost of removal is debited to the accumulated depreciation account. Under group depreciation, since the accumulated depreciation relates to the entire group rather than to specific assets within the group, no gain or loss is recognized. This assumes that the group depreciation rate is accurate for the group as a whole and that the cost of the retired asset, net of gross salvage and cost of removal, is being fully provided for in the accumulated depreciation account.

## Details of the Review

**Q8. Please describe the review that was undertaken to comply with negotiated settlement agreement.**

A8. The negotiated settlement determined that the following Units of Plant (accounts) be studied for review:

- C11 - Computers
- R14 - Routers and LAN
- S03 - Servers
- S05 - Software
- V04 - Vehicles - ¾ ton and under
- V06 - Vehicles - Cars, Stations Wagons and Vans

In addition to the above accounts, two additional accounts were reviewed, in order

to analyze the impacts when applied to longer life accounts with a retirement dispersion considered in the depreciation rates, and with a significantly larger level of investment as compared to the accounts as agreed to in negotiated settlement process. The two additional accounts were:

- C13 - Conductor
- P07 – Poles-Wood

**Q9. Please further explain why it was necessary to include the two additional accounts in the analysis.**

A9. The accounts that were selected during the negotiated settlement process were all short life accounts and most were subjected to a Square Iowa curve. The use of Square Iowa curves results in an analysis where the benefits of group accounting are eliminated due to the underlying assumption that the assets would be amortized in a method which removes any retirement dispersion. Secondly, short life accounts such as vehicles also have a limited amount of retirement dispersion, and therefore the benefits of group accounting would be reduced.

Given the above, Concentric Advisors suggested that the analysis to be completed by NLHydro should include at least two accounts that have long average service life estimates and would retire due to diverse forces of retirement.

**Q10. Please summarize the results of the review.**

A10. The analysis indicated that the benefits of group accounting increase as the life estimates and amount of retirement dispersion of the account increases. Consistent with this finding, the accounts that are amortized through the use of a square Iowa indicated more benefit of continued use of the Hybrid approach, whereas the long life accounts such as Wood poles and Conductor were virtually neutral as to the use of the current Hybrid approach versus traditional grouping accounting approaches.

A summary of the results of the testing is presented in the following table:

| Estimate of Increase in Depreciation in Moving to the Group Accounting Method | | | | | |
|---|---|---|---|---|---|
| UOP | Description | | 2013 | 2014 | 2015 |
| C11 | Computers | 5-Square | (41,924.12) | 507,678.91 | 616,991.42 |
| R14 | Routers and LAN | 5-Square | 9,948.78 | 422,351.76 | 571,690.71 |
| S03 | Servers | 7-Square | (5,387.18) | 784,970.35 | 842,901.91 |
| S05 | Software | 7-Square | 23,162.87 | 85,730.82 | 94,654.46 |
| V04 | Vehicles - 3/4 ton and Under | 7-L3 | 9,003.03 | 20,784.87 | 165,763.57 |
| V06 | Vehicles - Cars, Station Wagons and Vans | 6-L3 | 13,030.53 | 31,135.78 | 229,956.17 |
| C13 | Conductor | 60-R3 | (6,254.89) | (5,485.91) | (0.71) |
| P07 | Poles - Wood | 43-R1 | (50,827.16) | (9,775.94) | 20,049.82 |
| | | | (49,248.14) | 1,837,390.62 | 2,542,007.34 |

As noted above, the two long lived accounts indicate virtually no impact of a conversion to group accounting. I also note that as of December 31, 2015, accounts subjected to amortization accounting represent $79 million of the approximately of the $2.5 Billion (3.2%) of depreciable investment.

While the above analysis indicates that approximately $79 million of investment could be subjected to higher depreciation expense with a discontinuation of the current Hybrid approach, Concentric Advisors views that changes to the approach for the amortized accounts can be made that would eliminate this issue. As discussed in the Concentric Advisors depreciation study report, it is recommended that when each vintage for each applicable amortized account reaches the complete amortization period, that vintage be fully retired irrespective of whether the associated equipment is still in service. In this manner, these accounts would be depreciated in a manner consistent with the current Hybrid approach, and the impacts noted in the table above would be virtually eliminated.

**Q11. What is your Recommendation with regard to the Board Directive Based on this Review?**

A11. Based on the review as described herein, I recommend the following:

- That NL Hydro convert to a more traditional Group Accounting and Depreciation Practice for all accounts other than Amortized accounts as discussed below;

- That amortized accounts (as noted with a Square or SQ Iowa curve) be subjected to a pure amortization procedure wherein the investment in these accounts is retired when it reaches its full amortization period. All retirements in these accounts should be made only at the expiration of the amortization period.

**Q12. Does this conclude your Evidence?**

A12. Yes.

LARRY E. KENNEDY, CDP
VICE PRESIDENT

**Larry E. Kennedy, CDP**
**Vice President**

**TECHNICAL SPECIALTIES**

- Public Utility Plant Depreciation
- Public Utility Plant Accounting

**PERSONAL INFORMATION**

- Diploma, Applied Arts - Business Administration, Northern Alberta Institute of Technology, 1978
- Member, Society of Depreciation Professionals
- Certified Depreciation Professional

**EXPERIENCE**

Mr. Kennedy joined Gannett Fleming, Inc. in January 1999 and was Vice President of Gannett Fleming Canada ULC. Mr. Kennedy is now Vice President of Concentric Advisors UCL. His responsibilities include the assembly of data, the preparation and review of depreciation studies, advice to clients regarding asset retirement obligation accounting, plant accounting issues, and provision of general regulatory litigation support.
Representative assignments include:

**REPRESENTATIVE PROJECT EXPERIENCE**

- AltaGas Utilities Inc.: A number of depreciation studies have been completed, which included the assembly of basic data from the Company's accounting systems, statistical analysis of retirements for service life and net salvage indications, discussions with management regarding the outlook for property, and the calculations of annual and accrued depreciation. The studies were prepared for submission to the Alberta Energy and Utilities Board. Mr. Kennedy has appeared before the Alberta Utilities Commission on behalf of AltaGas on a number of occasions.

- AltaLink LP: An initial study was developed for submission to the Alberta Utilities Commission ("AUC") in 2002. The study included the estimation of service life characteristics, and the estimation of net salvage requirements for all electric transmission assets. A net salvage study and technical update was also filed with the Board in 2004. Since 2004 additional depreciation studies were filed in 2005, 2010 and 2012, and 2014. The 2010, 2012, and 2014 studies included a number of provisions in order to ensure compliance to Alberta's Minimum Filing Requirements for depreciation studies and for compliance to the International Financial Reporting Standards.

LARRY E. KENNEDY, CPA
VICE PRESIDENT

- ATCO: Studies have included the development of annual and accrued depreciation rates for the electric transmission and distribution systems for the Alberta Assets of ATCO Electric, in addition to the generation, transmission, and distribution assets of Northland Utilities (NWT) Inc. and the distribution assets of Northland Utilities (Yellowknife) Inc. ATCO Electric studies were submitted to the AUC for review, while the Northland Utilities Inc. studies were submitted to the Northwest Territories Utilities Board and Yukon Electric Company Limited (YECL) was submitted to Yukon Public Utilities Board. ATCO Gas studies were prepared in 2010 and were the subject of a review by the AUC. Elements of all of the studies included the service life analysis for all accounts using the retirement rate analysis, discussion with management regarding outlook, and the estimation of net salvage requirements.

- BC Hydro: This assignment included the development of an average service life study for all of the BC Hydro's electric generation, transmission, distribution and general plant assets. The study, which was prepared for submission to the British Columbia Utilities Commission ("BCUC), included development of depreciation policy for the company, development of procedures to extract data from the company databases, tours of the company facilities, interviews with operational and management representatives, and the compilation of a detailed report. The assignment included the support of the study through the regulatory process. Mr. Kennedy has also completed a review of the cost allocation procedures and practices which was filed with the BCUC in 2010.

- Centra Gas Manitoba, Inc.: The study included development of annual and accrued depreciation rates for all gas plant in service. Elements of the study included a field inspection of metering and compression facilities, service buildings and other gas plant; service life analysis for all accounts using the retirement rate analysis on a combined database developed from actuarial data and data developed through the computed method; discussions with management regarding outlook; and the estimation of net salvage requirements. A similar study was completed in 2006, 2011, and 2014. The 2011 and 2014 depreciation studies were the subject of a review by the Manitoba Public Utilities Board in 2012 and 2015. Mr. Kennedy has also consulted on issues regarding IFRS compliance and required componentization.

- Enbridge Gas Distribution Inc.: Full and Comprehensive depreciation studies have been completed in 2009 and 2011. The 2009 study also included review of the company's gas storage operations. Both studies included the development of annual and accrued depreciation rates for all depreciable natural gas distribution, transmission and general plant assets. Elements of the studies included the service life analysis for all accounts using the computed mortality method of analysis, discussion with management regarding outlook, and the estimation of net salvage requirements. Studies were prepared for submission to the Ontario Energy Board.

- Mr. Kennedy has also completed an allocation of the accumulated depreciation accounts into the amounts related to the recovery of original cost and the amounts recovered in tolls for the future removal of assets currently in service. The allocations were determined as of December 31, 2009 and were deemed by the company's external auditors to be in conformance with proper accounting standards and procedures. In 2013, a review of the reserve required for the future removal of assets currently in

service was undertaken by Mr. Kennedy. The results of the review were summarized in evidence presented by Mr. Kennedy to the Ontario Energy Board.

- ENMAX Power Corporation: Studies have included the development of annual and accrued depreciation rates for all depreciable electric transmission assets. Elements of the studies included the service life analysis for all accounts using the retirement rate analysis, discussion with management regarding outlook, and the estimation of net salvage requirements. Studies were prepared for submission to the Alberta Department of Energy and more recently for submission to the Alberta Energy and Utilities Board. Similar studies have also been completed for submission for the ENMAX Electric Distribution assets for submission to the AUC. The ENMAX distribution asset assignments also included an extensive asset verification project where the plant accounting and operational asset records were verified to the field assets actually in service.

- Fortis Inc.: Studies have included the development of annual and accrued depreciation rates for the electric distribution assets in Alberta and for the generation, transmission, and distribution assets in British Columbia. The FortisBC Inc. studies were completed and filed with the BCUC in 2005, 2010, 2011 and 2015 encompassing both the FortisBC electric and natural gas companies. FortisAlberta studies were completed in 2004 (updated in 2005), 2009 and 2010. Additionally, a Technical Update was prepared for FortisAlberta in 2015 and submitted to the AUC for review. Elements of the studies included the development of average service lives using the retirement rate method of analysis, development of net salvage estimates, compliance with IFRS, and the determination of appropriate annual accrual and accrued depreciation rates.

- International Financial Reporting Standards (IFRS): Mr. Kennedy has been retained by numerous clients encompassing most Canadian Provinces and Territories. The assignments included the review of company's assets and depreciation practices to provide opinion on the compliance to the IFRS. The assignments have also included the issuance of opinion to the External Auditors of Utilities to comment on the manner in which the Utilities can minimize differences in the regulatory ledgers and the accounting records used for financial disclosure purposes. Mr. Kennedy has also presented to the Canadian Electric Association, the Society of Depreciation Professionals, the Canadian Energy Pipeline Association, and to the British Columbia Utilities Commission on this topic.

- Mackenzie Valley Pipeline Project: This assignment included the review of the proposed depreciation schedule for the proposed Mackenzie Valley Pipeline. The review included a discussion of the policies used by the company and the depreciation concepts to be included in a depreciation schedule for a Greenfield pipeline. The review was supported through appearance at the oral public hearings before the National Energy Board of Canada.

- Manitoba Hydro: A study was developed to determine the appropriate depreciation parameters for all electric generation, transmission and distribution assets. The study was submitted to the Manitoba Public Utilities Board. Elements of the study included a

field review of electric generation and transmission plant, the service life analysis for all accounts using the retirement rate analysis, discussion with management regarding outlook, and the estimation of net salvage requirements. A similar study was also completed in 2006 2011, and 2014. The 2011 and 2014 depreciation studies were the subject of a review by the Manitoba Public Utilities Board in 2012 and 2015. Mr. Kennedy has also consulted with Manitoba Hydro on issues regarding IFRS compliance and required componentization.

- Newfoundland and Labrador Hydro: Mr. Kennedy developed a comprehensive depreciation study that included the development of depreciation policy and rates for Newfoundland and Labrador Hydro. The study provided a significant review of the previous depreciation policy, which included use of a sinking fund depreciation method and provided justification for the conversation to the straight-line depreciation method. The study, which was prepared for submission to the Newfoundland and Labrador Utilities Commission, included a significant amount of discussion regarding the development of depreciation policy for the company. The study also included development of procedures to extract data from the company databases, tours of the company facilities, interviews with operational and management representatives, development of appropriate net salvage rates, development of average service life estimates, and the compilation of the report for submission in a General Tariff Application. Additional studies were also completed in 2008 and 2010. The 2010 study was the subject of Regulatory Review in 2012.

- Ontario Power Generation: Assignments have included a review of the Depreciation Review Committee process completed in 2007. This review provided recommendations for enhanced internal processes and controls in order to ensure that the depreciation expense reflects the annual consumption of service value. Additionally, full assessments of the lives the regulated assets were completed in 2011 and 2013, and were submitted to the Ontario Energy Board for review.

- TransCanada PipeLines Limited – Alberta Facilities: The assignment included working with the company to develop the appropriate depreciation policy to align with the organization's overall goals and objectives. The resulting depreciation study, which was submitted to the Alberta Energy and Utilities Board, incorporated the concepts of time-based depreciation for gas transmission accounts and unit based depreciation for gathering facilities. The data was assembled from two different accounting systems and statistical analysis of service life and net salvage were performed. For gathering accounts, the assignment included the oversight of the development of appropriate gas production and ultimate gas potential studies for specific areas of gas supply. Field inspections of gas compression, metering and regulating, and service operations were conducted. Studies were completed in 2002 and 2004, 2007, 2009 and 2012.

- TransCanada PipeLines Limited – Mainline Facilities: The study prepared for submission to the National Energy Board of Canada ("NEB") included the development of annual and accrued depreciation rates for gas transmission plant east of the Alberta – Saskatchewan border. Elements of the study included a field inspection of compression and metering facilities, service life and net salvage analysis for all accounts. The study was completed in 2002, and was supported through an appearance

before the NEB. Study updates have been completed in 2005, 2007, 2009 and an additional full and comprehensive study was completed in 2011. The 2011 study was fully supported through an appearance before the NEB in 2012

Mr. Kennedy has successfully completed the series of week-long programs offered by Depreciation Programs, Inc. and is a past president of the Society of Depreciation Professionals.

| YEAR | CLIENT | APPLICANT | REGULATORY BOARD | PROCEEDING NUMBER |
|---|---|---|---|---|
| 1999 | ENMAX Power Corporation | Edmonton Power Corporation | Alberta Energy and Utilities Board | 980550 |
| 2000 | AltaGas Utilities Inc. | AltaGas Utilities Inc. | Alberta Energy and Utilities Board | Decision 2002-43 |
| 2001 | City of Calgary | ATCO Pipelines South | Alberta Energy and Utilities Board | 2000-365 |
| 2001 | City of Calgary | ATCO Gas South | Alberta Energy and Utilities Board | 2000-350 |
| 2001 | City of Calgary | ATCO Affiliate Proceeding | Alberta Energy and Utilities Board | 1237673 |
| 2001 | ENMAX Power Corporation | ENMAX Power Corporation - Transmission | Alberta Department of Energy | N/A |
| 2002 | Centra Gas British Columbia | Centra Gas British Columbia | British Columbia Utilities Commission | N/A |
| 2002 | ENMAX Power Corporation | ENMAX Power Corporation - Transmission | Alberta Department of Energy | N/A |
| 2003 | AltaLink LP | AltaLink LP | Alberta Energy and Utilities Board | 1279345 |
| 2003 | Centra Gas Manitoba | Centra Gas Manitoba | Manitoba Public Utilities Board | N/A |
| 2003 | City of Calgary | ATCO Pipelines | Alberta Energy and Utilities Board | 1292783 |
| 2003 | City of Calgary | ATCO Electric-ISO Issues | Alberta Energy and Utilities Board | N/A |
| 2003 | City of Calgary | ATCO Gas | Alberta Energy and Utilities Board | 1275466 |
| 2003 | City of Calgary | ATCO Electric | Alberta Energy and Utilities Board | 1275494 |
| 2003 | Manitoba Hydro | Manitoba Hydro | Manitoba Public Utilities Board | N/A |
| 2003 | TransCanada Pipelines Limited | TransCanada Pipelines Limited | National Energy Board of Canada | RH-1-2002 |
| 2004 | AltaGas Utilities Inc. | AltaGas Utilities Inc. | Alberta Energy and Utilities Board | 1305995 |

| YEAR | CLIENT | APPLICANT | REGULATORY BOARD | PROCEEDING NUMBER |
|---|---|---|---|---|
| 2004 | AltaLink LP | AltaLink LP | Alberta Energy and Utilities Board | 1336421 |
| 2004 | Central Alberta Midstream | Central Alberta Midstream | Municipal Government Board of Alberta | N/A |
| 2004 | Central Alberta Midstream | Central Alberta Midstream | Municipal Government Board of Alberta | N/A |
| 2004 | ENMAX Power Corporation | ENMAX Power Corporation | Alberta Energy and Utilities Board | 1306819 |
| 2004 | Heritage Gas Ltd. | Heritage Gas Ltd. | Nova Scotia Utility and Review Board | N/A |
| 2004 | NOVA Gas Transmission Limited | NOVA Gas Transmission Limited | Alberta Energy and Utilities Board | 1315423 |
| 2004 | Westridge Utilities Inc. | Westridge Utilities Inc. | Alberta Energy and Utilities Board | 1279926 |
| 2005 | AltaGas Utilities Inc. | AltaGas Utilities Inc. | Alberta Energy and Utilities Board | 1378000 |
| 2005 | ATCO Electric | ATCO Electric | Alberta Energy and Utilities Board | 1399997 |
| 2005 | ATCO Power | ATCO Power | Municipal Government Board of Alberta | N/A |
| 2005 | British Columbia Transmission Corporation | British Columbia Transmission Corporation | British Columbia Utilities Commission | N/A |
| 2005 | Centra Gas Manitoba | Centra Gas Manitoba | Manitoba Public Utilities Board | N/A |
| 2005 | ENMAX Power Corporation | ENMAX Power Corporation-Transmission | Alberta Energy and Utilities Board | N/A |
| 2005 | ENMAX Power Corporation | ENMAX Power Corporation-Distribution Assets | Alberta Energy and Utilities Board | 1380613 |
| 2005 | FortisAlberta Inc. | FortisAlberta Inc. | Alberta Energy and Utilities Board | 1371998 |
| 2005 | FortisAlberta Inc. | FortisAlberta Inc. | Alberta Energy and Utilities Board | N/A |

| YEAR | CLIENT | APPLICANT | REGULATORY BOARD | PROCEEDING NUMBER |
|---|---|---|---|---|
| 2005 | FortisBC, Inc. | FortisBC, Inc. | British Columbia Utilities Commission | N/A |
| 2005 | Manitoba Hydro | Manitoba Hydro | Manitoba Public Utilities Board | N/A |
| 2005 | New Brunswick Board of Commissioners of Public Utilities | New Brunswick Power Distribution and Customer Service Company | New Brunswick Board of Commissioners of Public Utilities | N/A |
| 2005 | Northland Utilities (NWT) Inc. | Northland Utilities (NWT) Inc. | Northwest Territories Utilities Board | N/A |
| 2005 | Northland Utilities (Yellowknife) Inc. | Northland Utilities (Yellowknife) Inc. | Northwest Territories Utilities Board | N/A |
| 2005 | NOVA Gas Transmission Ltd. | NOVA Gas Transmission Ltd. | Alberta Energy and Utilities Board | 1375375 |
| 2005 | City of Red Deer | City of Red Deer Electric System | Alberta Energy and Utilities Board | 1402729 |
| 2005 | Yukon Energy Corporation | Yukon Energy Corporation | Yukon Utilities Board | N/A |
| 2006 | AltaLink LP | AltaLink LP | Alberta Energy and Utilities Board | 1456797 |
| 2006 | BC Hydro | BC Hydro | British Columbia Utilities Commission | N/A |
| 2006 | Imperial Oil Resources Ventures Limited | McKenzie Valley Pipeline Project | National Energy Board of Canada | GH-1-2004 |
| 2007 | Enbridge Pipelines Limited | Enbridge Pipelines Limited | National Energy Board of Canada | RH-2-2007 |
| 2007 | FortisAlberta Inc. | Fortis Alberta Inc. | Alberta Energy and Utilities Board | 1514140 |
| 2007 | Kinder Morgan | Terasen (Jet fuel) Pipeline Limited | British Columbia Utilities Commission | N/A |
| 2008 | ATCO Electric | Yukon Electrical Company Limited | Yukon Utilities Board | N/A |
| 2008 | ATCO Gas | ATCO Gas | Alberta Utilities Commission | 1553052 |

| YEAR | CLIENT | APPLICANT | REGULATORY BOARD | PROCEEDING NUMBER |
|---|---|---|---|---|
| 2008 | City of Lethbridge Electric System | City of Lethbridge | Alberta Utilities Commission | N/A |
| 2008 | ENMAX Power Corporation | ENMAX Power Corporation | Alberta Utilities Commission | 1512089 |
| 2008 | Heritage Gas Ltd. | Heritage Gas Ltd. | Nova Scotia Utility and Review Board | N/A |
| 2009 | AltaGas Utilities Inc. | AltaGas Utilities Inc. | Alberta Utilities Commission | N/A |
| 2009 | Fortis Alberta Inc. | Fortis Alberta, Inc. | Alberta Utilities Commission | 1605170 |
| 2010 | ATCO Electric | ATCO Electric | Alberta Utilities Commission | 1606228 |
| 2010 | Enbridge Pipelines Limited· Line 9 | Enbridge Pipelines Limited - Line 9 | National Energy Board of Canada | N/A |
| 2010 | Gazifere | Gazifere | La Regie de L'Energie | R-3724-2010 |
| 2010 | Kinder Morgan | Kinder Morgan | National Energy Board of Canada | N/A |
| 2010 | Pacific Northern Gas | Pacific Northern Gas | British Columbia Utilities Commission | N/A |
| 2011 | AltaGas Utilities Inc. | AltaGas Utilities Inc. | Alberta Utilities Commission | 1606694 |
| 2011 | AltaLink LP | AltaLink LP | Alberta Utilities Commission | 1606895 |
| 2011 | ATCO Electric | Northland Utilities (NWT) Inc. | Northwest Territories Utility Board | N/A |
| 2011 | ATCO Gas | ATCO Gas | Alberta Utilities Commission | 1606822 |
| 2011 | FortisAlberta Inc. | Fortis Alberta Inc. | Alberta Utilities Commission | 1607159 |
| 2011 | FortisBC Energy, Inc. | FortisBC Energy, Inc. | British Columbia Utilities Commission | 3698627 |
| 2011 | GazMetro | GazMetro | La Regie de L'Energie | R-3752-2011 |



Revision 2 - October 16, 2017
Exhibit 11 - Depreciation Study
Page 609 of 633

| YEAR | CLIENT | APPLICANT | REGULATORY BOARD | PROCEEDING NUMBER |
|---|---|---|---|---|
| 2011 | Heritage Gas Ltd. | Heritage Gas Ltd. | Nova Scotia Utility and Review Board | N/A |
| 2011 | Qulliq | Qulliq | Utilities Rates Review Council | N/A |
| 2011 | SaskPower | SaskPower | Internal Review Committee | N/A |
| 2011 | TransAlta Utilities Corporation | TransAlta Utilities Corporation | Municipal Government Board of Alberta | N/A |
| 2012 | City of Red Deer | City of Red Deer | Alberta Utilities Commission | 1608641 |
| 2012 | Enbridge Gas Distribution Inc. | Enbridge Gas Distribution Inc. | Ontario Energy Board | EB 2011-0345 |
| 2012 | FortisBC, Inc. | FortisBC, Inc. | British Columbia Utilities Commission | 3698620 |
| 2012 | Manitoba Hydro | Manitoba Hydro | Manitoba Public Utilities Board | 2013/2013 GRA |
| 2012 | Newfoundland and Labrador Hydro | Newfoundland and Labrador Hydro | Newfoundland and Labrador Board of Commissioners of Public Utilities | N/A |
| 2012 | Northwest Territories Power Corporation | Northwest Territories Power Corporation | Northwest Territories Public Utilities Board | N/A |
| 2012 | TransCanada Pipelines Limited | TransCanada Pipelines Limited | National Energy Board of Canada | RH-003 -2011 |
| 2013 | AltaLink LP | AltaLink LP | Alberta Utilities Commission | 1608711 |
| 2013 | lntraGaz Incorporated | lntraGaz Incorporated | La Regie de L'Energie | R-3807-2012 |
| 2013 | Yukon Electrical Company Limited (YECL) | Yukon Electrical Company Limited (YECL) | Yukon Utilities Board | 2013-2015 GRA |
| 2014 | Enbridge Gas Distribution | Enbridge Gas Distribution | Ontario Energy Board | EB-2012-0459 |
| 2014 | ENMAX Power Corporation | ENMAX Power Corporation | Alberta Utilities Commission | 1609674 |
| 2015 | AltaLink LP | AltaLink LP | Alberta Utilities Commission | Proceeding 3524 Appearance Pending |

| YEAR | CLIENT | APPLICANT | REGULATORY BOARD | PROCEEDING NUMBER |
|---|---|---|---|---|
| 2015 | EPCOR Distribution & Transmission | EPCOR Distribution & Transmission | Alberta Utilities Commission | Proceeding 20407 |
| 2015 | EPCOR Distribution & Transmission | EPCOR Distribution & Transmission | Alberta Utilities Commission | Appearance Pending |
| 2015 | FortisBC Energy, Inc. | FortisBC Energy, Inc. | British Columbia Utilities Commission | N/A |
| 2015 | FortisBC, Inc. | FortisBC, Inc. | British Columbia Utilities Commission | Appearance Pending |
| 2015 | GazMetro | GazMetro | La Regie de L'Energie | N/A |
| 2015 | Manitoba Hydro | Manitoba Hydro | Manitoba Public Utilities Board | 2014/15 & 2015/16 GRA |
| 2015 | Newfoundland and Labrador Hydro | Newfoundland and Labrador Hydro | Newfoundland and Labrador Board of Commissioners of Public Utilities | N/A |
| 2016 | ATCO Electric | ATCO Electric | Alberta Utilities Commission | Proceeding 20272 Appearance Pending |

# APPENDIX 2

# ESTIMATION OF SURIVOR CURVES

## ESTIMATION OF SURVIVOR CURVES

### Average Service Life

The use of an average service life for a property group implies that the various units in the group have different lives. Thus, the average life may be obtained by determining the separate lives of each of the units, or by constructing a survivor curve by plotting the number of units which survive at successive ages. A discussion of the general concept of survivor curves is presented. Also, the Iowa type survivor curves are reviewed.

## SURVIVOR CURVES

The survivor curve graphically depicts the amount of property existing at each age throughout the life of an original group. From the survivor curve, the average life of the group, the remaining life expectancy, the probable life, and the frequency curve can be calculated. In Figure 1, a typical smooth survivor curve and the derived curves are illustrated. The average life is obtained by calculating the area under the survivor curve, from age zero to the maximum age, and dividing this area by the ordinate at age zero. The remaining life expectancy at any age can be calculated by obtaining the area under the curve, from the observation age to the maximum age, and dividing this area by the percent surviving at the observation age. For example, in Figure 1, the remaining life at age 30 is equal to the crosshatched area under the survivor curve divided by 29.5 percent surviving at age 30. The probable life at any age is developed by adding the age and remaining life. If the probable life of the property is calculated for each year of age, the probable life curve shown in the chart can be developed. The frequency curve presents the number of units retired in each age interval. It is derived by obtaining the differences between the amount of property surviving at the beginning and at the end of each interval.

### Iowa Type Curves

The range of survivor characteristics usually experienced by utility and industrial properties is encompassed by a system of generalized survivor curves known as the

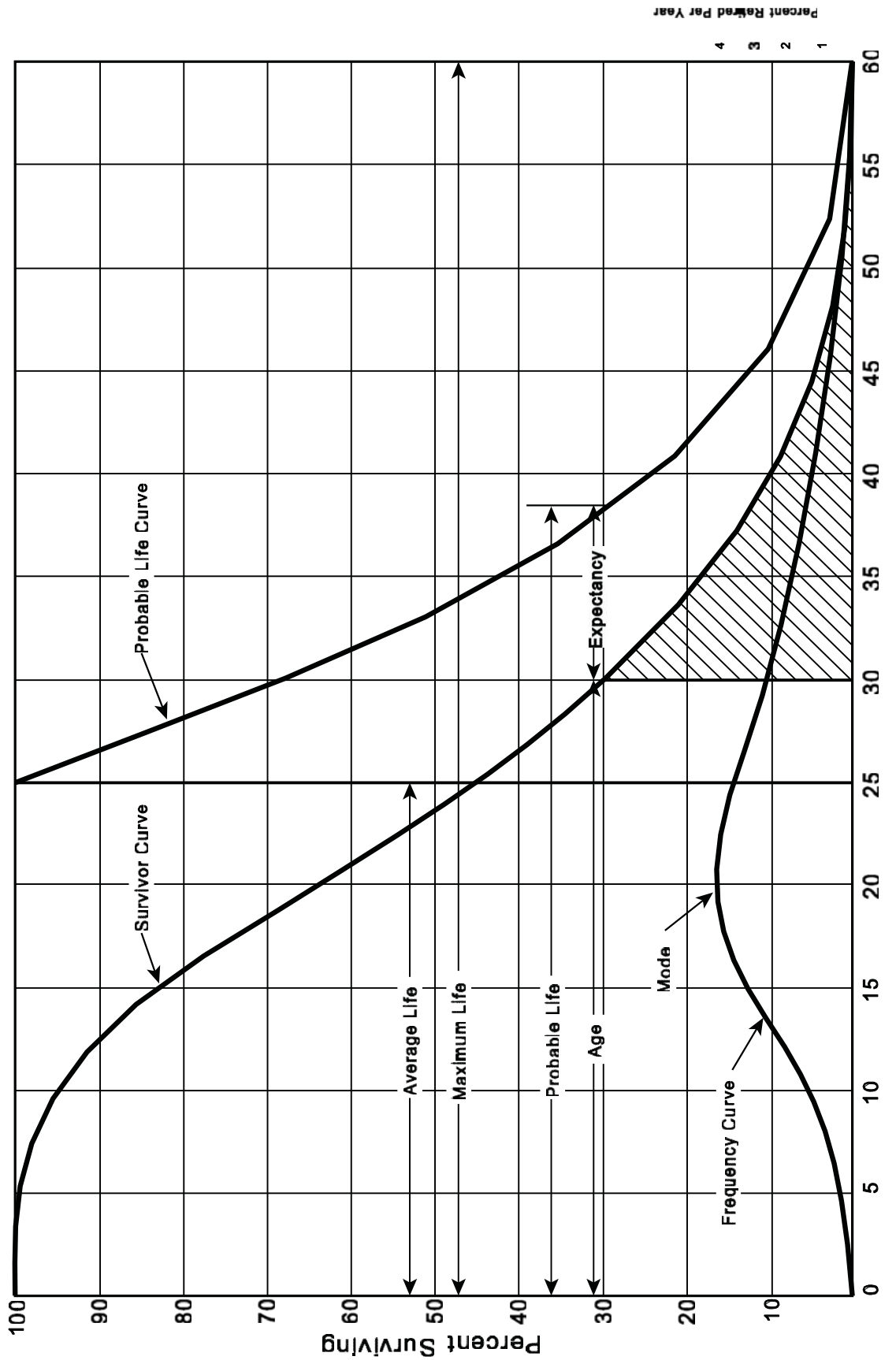



Figure 1. A Typical Survivor Curve and Derived Curves

Iowa type curves. There are four families in the Iowa system, labeled in accordance with the location of the modes of the retirements in relationship to the average life and the relative height of the modes. The left moded curves, presented in Figure 2, are those in which the greatest frequency of retirement occurs to the left of, or prior to, average service life. The symmetrical moded curves, presented in Figure 3, are those in which the greatest frequency of retirement occurs at average service life. The right moded curves, presented in Figure 4, are those in which the greatest frequency occurs to the right of, or after, average service life. The origin moded curves, presented in Figure 5, are those in which the greatest frequency of retirement occurs at the origin, or immediately after age zero. The letter designation of each family of curves (L, S, R or O) represents the location of the mode of the associated frequency curve with respect to the average service life. The numbers represent the relative heights of the modes of the frequency curves within each family.

The Iowa curves were developed at the Iowa State College Engineering Experiment Station through an extensive process of observation and classification of the ages at which industrial property had been retired. A report of the study which resulted in the classification of property survivor characteristics into 18 type curves, which constitute three of the four families, was published in 1935 in the form of the Experiment Station's Bulletin 125.[1] These curve types have also been presented in subsequent Experiment Station bulletins and in the text, "Engineering Valuation and Depreciation."[2] In 1957, Frank V. B. Couch, Jr., an Iowa State College graduate student, submitted a thesis[3] presenting his development of the fourth family consisting of the four O type survivor curves.

[1] Winfrey, Robley. Statistical Analyses of Industrial Property Retirements. Iowa State College, Engineering Experiment Station, Bulletin 125. 1935.

[2]Marston, Anson, Robley Winfrey and Jean C. Hempstead. Engineering Valuation and Depreciation, 2nd Edition. New York, McGraw-Hill Book Company. 1953.

[3]Couch, Frank V. B., Jr. "Classification of Type O Retirement Characteristics of Industrial Property." Unpublished M.S. thesis (Engineering Valuation). Library, Iowa State College, Ames, Iowa. 1957.

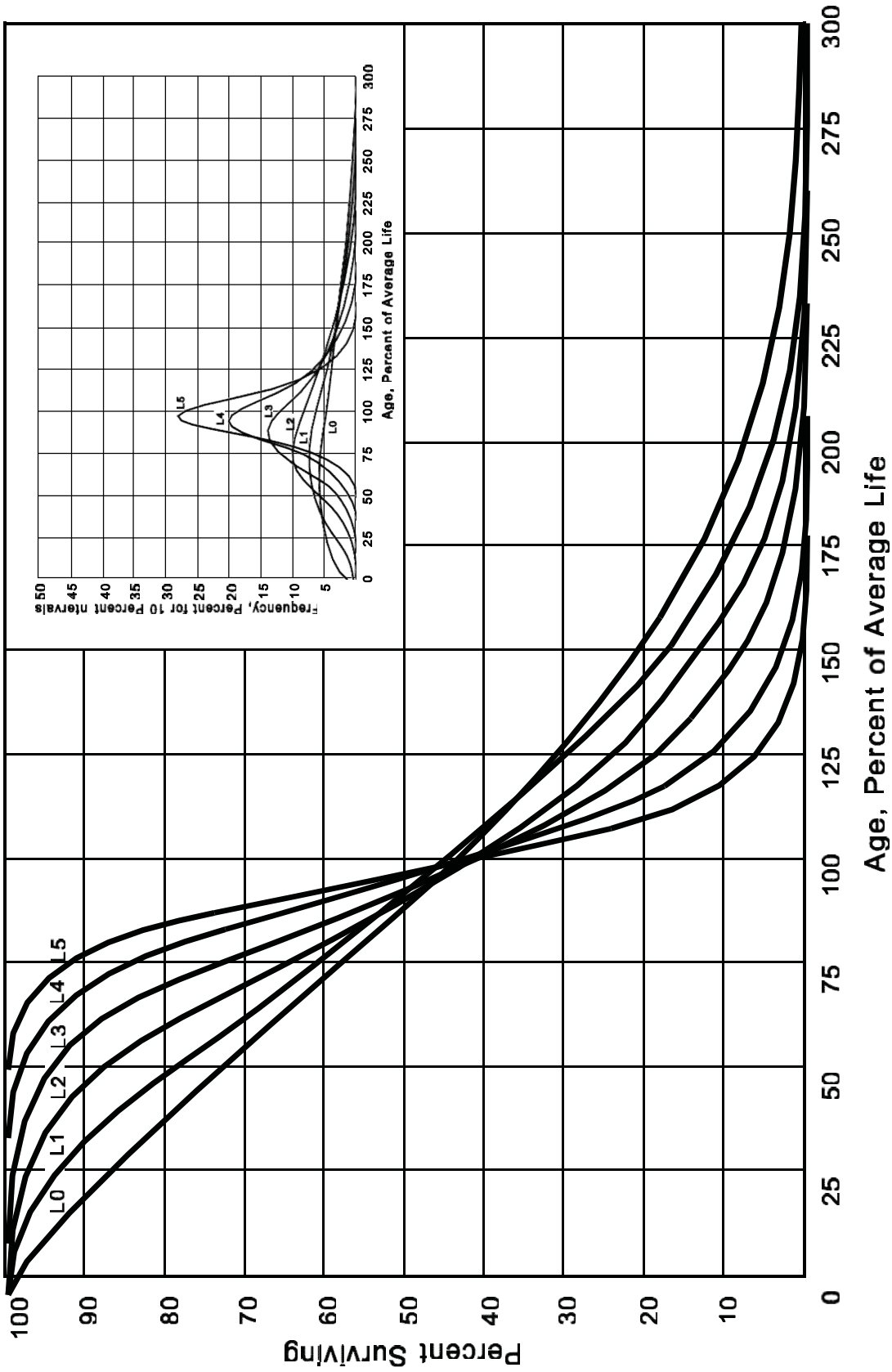



Figure 2. Left Modal or "L" Iowa Type Survivor Curves

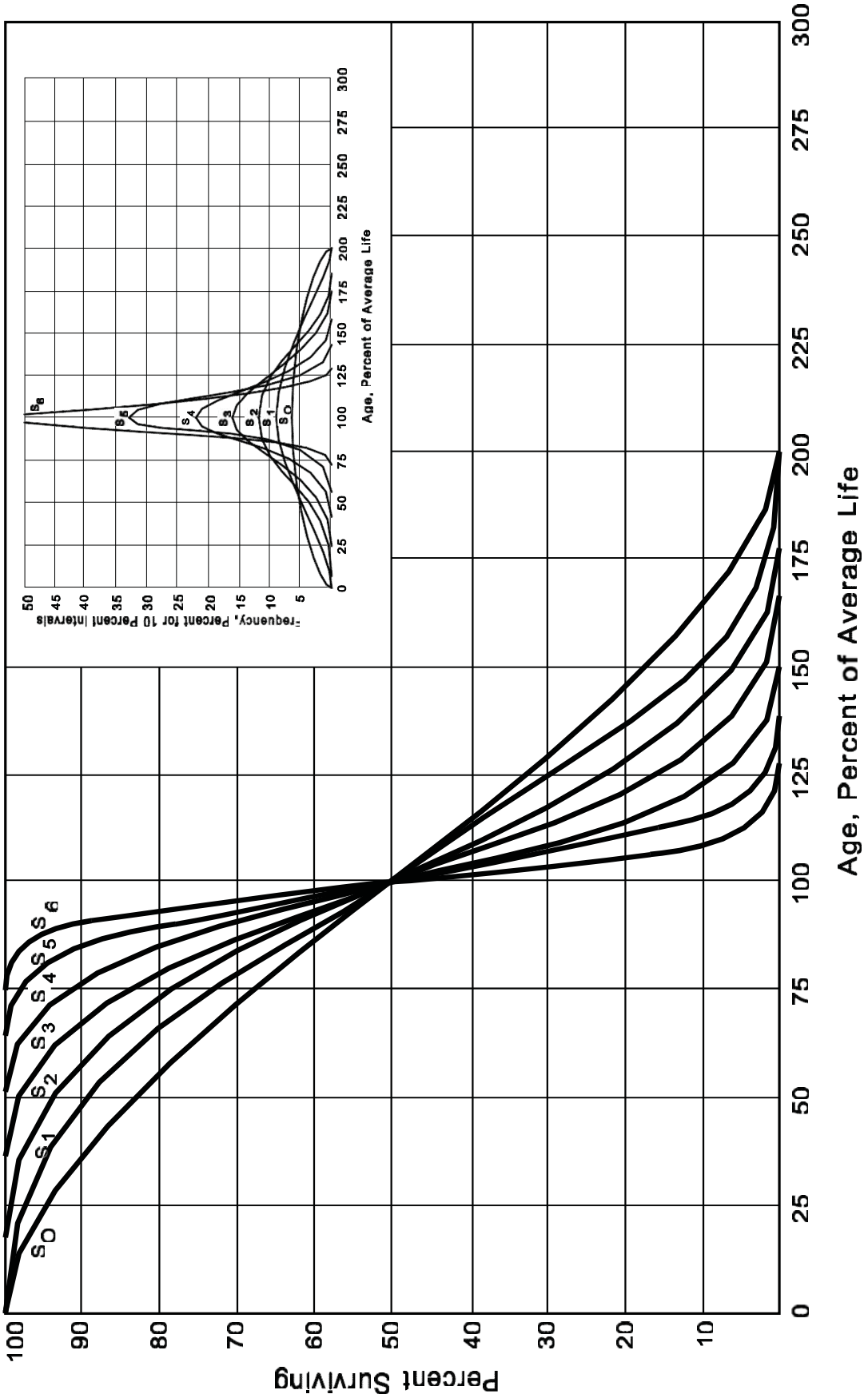



Figure 3. Symmetrical or "S" Iowa Type Survivor Curves

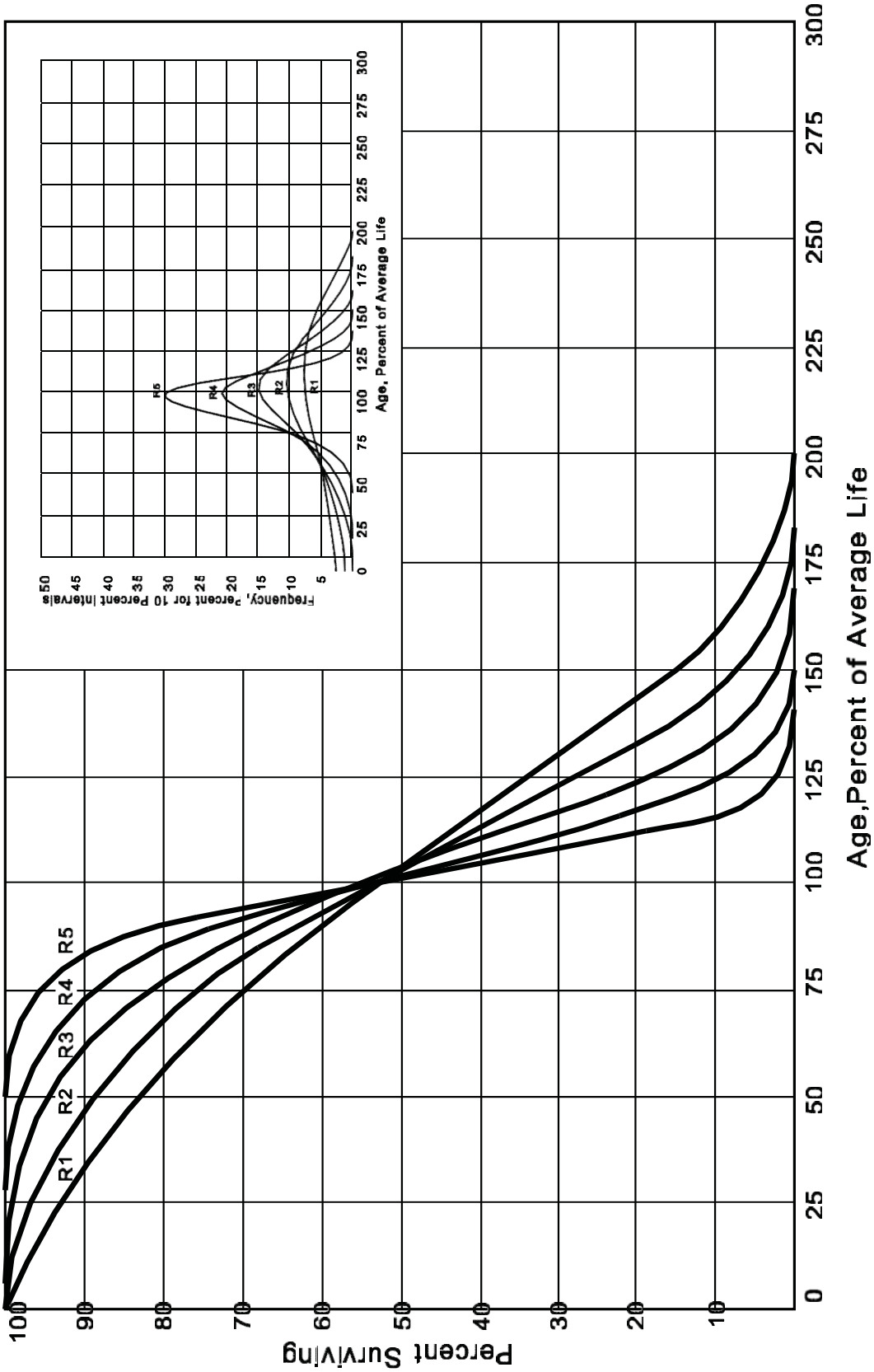



Figure 4. Right Modalor "R" Iowa Type Survivor Curves

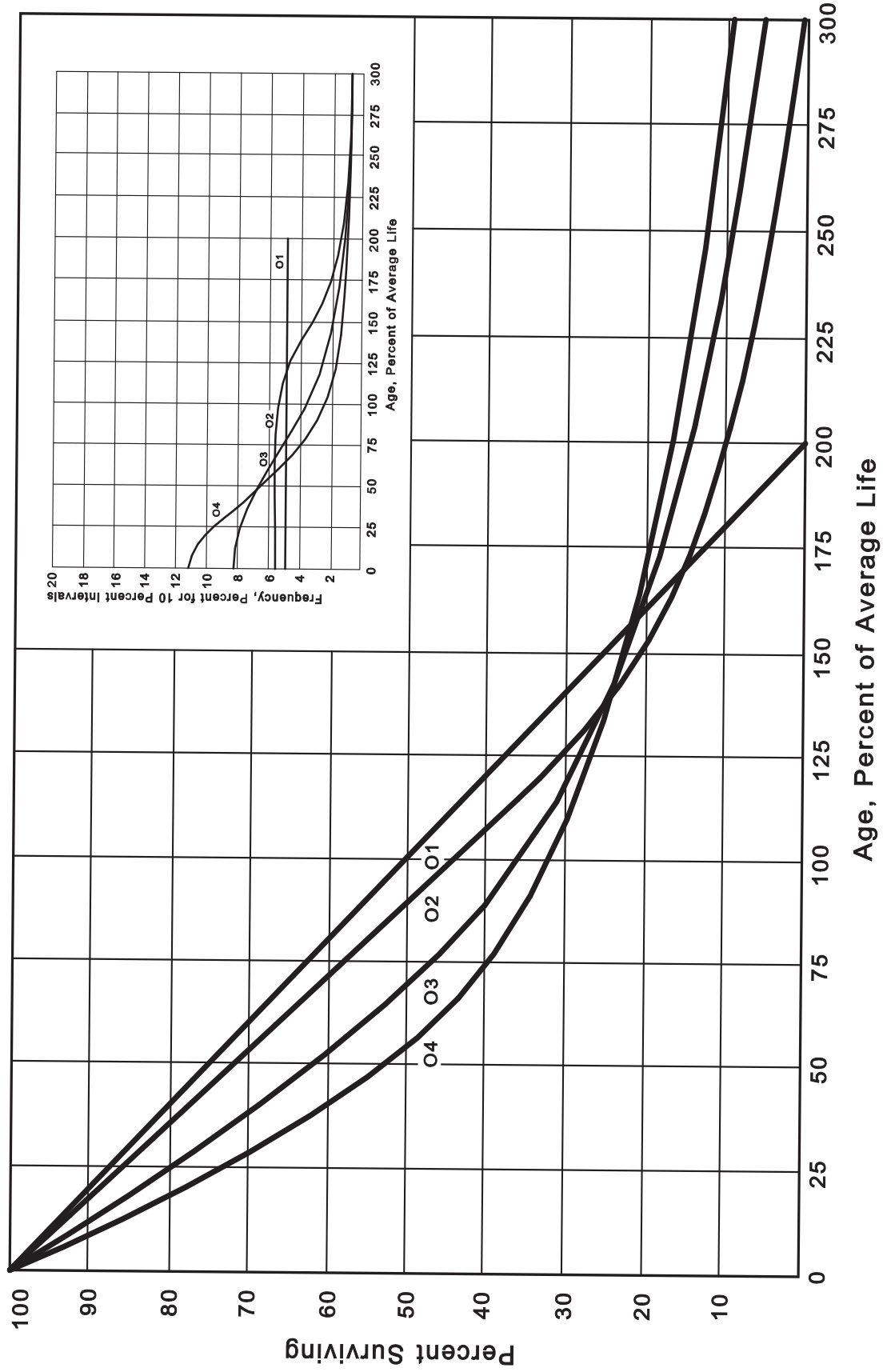



Figure 5. Origin Modal or "O" Iowa Type Survivor Curves

## Retirement Rate Method of Analysis

The retirement rate method is an actuarial method of deriving survivor curves using the average rates at which property of each age group is retired. The method relates to property groups for which aged accounting experience is available and is the method used to develop the original stub survivor curves in this study. The method (also known as the annual rate method) is illustrated through the use of an example in the following text, and is also explained in several publications, including "Statistical Analyses of Industrial Property Retirements,"[4] "Engineering Valuation and Depreciation,"[5] and "Depreciation Systems."[6]

The average rate of retirement used in the calculation of the percent surviving for the survivor curve (life table) requires two sets of data: first, the property retired during a period of observation, identified by the property's age at retirement; and second, the property exposed to retirement at the beginning of the age intervals during the same period. The period of observation is referred to as the experience band, and the band of years which represent the installation dates of the property exposed to retirement during the experience band is referred to as the placement band. An example of the calculations used in the development of a life table follows. The example includes schedules of annual aged property transactions, a schedule of plant exposed to retirement, a life table and illustrations of smoothing the stub survivor curve.

## Schedules of Annual Transactions in Plant Records

The property group used to illustrate the retirement rate method is observed for the experience band 2007-2016 during which there were placements during the years 2007-2016. In order to illustrate the summation of the aged data by age interval, the data were compiled in the manner presented in Schedules 1 and 2 on the following pages. In Schedule 1, the year of installation (year placed) and the year of retirement are shown. The age interval during which a retirement occurred is determined from this information. In the example which follows, $10,000 of the dollars invested in 2002 were

[4]Winfrey, Robley, Supra Note 1.
[5]Marston, Anson, Robley Winfrey, and Jean C. Hempstead, Supra Note 2.
[6]Wolf, Frank K. and W. Chester Fitch. Depreciation Systems. Iowa State University Press. 1994.

SCHEDULE 1. RETIREMENTS FOR EACH YEAR 2007-2016
SUMMARIZED BY AGE INTERVAL

Experience Band 2007-2016 Placement Band 2002-2016

| Year Placed | Retirements, Thousands of Dollars During Year | | | | | | | | | | Total During Age Interval | Age Interval |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| 2002 | 10 | 11 | 12 | 13 | 14 | 16 | 23 | 24 | 25 | 26 | 26 | 13½-14½ |
| 2003 | 11 | 12 | 13 | 15 | 16 | 18 | 20 | 21 | 22 | 19 | 44 | 12½-13½ |
| 2004 | 11 | 12 | 13 | 14 | 16 | 17 | 19 | 21 | 22 | 18 | 64 | 11½-12½ |
| 2005 | 8 | 9 | 10 | 11 | 11 | 13 | 14 | 15 | 16 | 17 | 83 | 10½-11½ |
| 2006 | 9 | 10 | 11 | 12 | 13 | 14 | 16 | 17 | 19 | 20 | 93 | 9½-10½ |
| 2007 | 4 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 20 | 105 | 8½-9½ |
| 2008 | | 5 | 11 | 12 | 13 | 14 | 15 | 16 | 18 | 20 | 113 | 7½-8½ |
| 2009 | | | 6 | 12 | 13 | 15 | 16 | 17 | 19 | 19 | 124 | 6½-7½ |
| 2010 | | | | 6 | 13 | 15 | 16 | 17 | 19 | 19 | 131 | 5½-6½ |
| 2011 | | | | | 7 | 14 | 16 | 17 | 19 | 20 | 143 | 4½-5½ |
| 2012 | | | | | | 8 | 18 | 20 | 22 | 23 | 146 | 3½-4½ |
| 2013 | | | | | | | 9 | 20 | 22 | 25 | 150 | 2½-3½ |
| 2014 | | | | | | | | 11 | 23 | 25 | 151 | 1½-2½ |
| 2015 | | | | | | | | | 11 | 24 | 153 | ½-1½ |
| 2016 | | | | | | | | | | 13 | 80 | 0-½ |
| Total | 53 | 68 | 86 | 106 | 128 | 157 | 196 | 231 | 273 | 308 | 1,606 | |

SCHEDULE 2. OTHER TRANSACTIONS FOR EACH YEAR 2007-2016
SUMMARIZED BY AGE INTERVAL

Experience Band 2007-2016 Placement Band 2007-2016

| Year Placed | Acquisitions, Transfers and Sales, Thousands of Dollars During Year | | | | | | | | | | Total During Age Interval | Age Interval |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| 2002 | - | - | - | - | - | - | 60[a] | - | - | - | - | 13½-14½ |
| 2003 | - | - | - | - | - | - | - | - | - | - | - | 12½-13½ |
| 2004 | - | - | - | - | - | - | - | - | - | - | - | 11½-12½ |
| 2005 | - | - | - | - | - | - | - | (5)[b] | - | - | 60 | 10½-11½ |
| 2006 | - | - | - | - | - | - | - | 6[a] | - | - | - | 9½-10½ |
| 2007 | - | - | - | - | - | - | - | - | - | - | (5) | 8½-9½ |
| 2008 | | - | - | - | - | - | - | - | - | - | - | 7½-8½ |
| 2009 | | | - | - | - | - | - | - | - | - | - | 6½-7½ |
| 2010 | | | | - | - | - | - | (12)[b] | - | - | - | 5½-6½ |
| 2011 | | | | | - | - | - | - | 22[a] | - | - | 4½-5½ |
| 2012 | | | | | | - | - | (19)[b] | - | - | 10 | 3½-4½ |
| 2013 | | | | | | | - | - | - | - | - | 2½-3½ |
| 2014 | | | | | | | | - | - | (102)[c] | (121) | 1½-2½ |
| 2015 | | | | | | | | | - | - | - | ½-1½ |
| 2016 | | | | | | | | | | | | 0-½ |
| Total | - | - | - | - | - | - | 60 | (30) | 22 | (102) | (50) | |

[a] Transfer Affecting Exposures at Beginning of Year
[b] Transfer Affecting Exposures at End of Year
[c] Sale with Continued Use
Parentheses Denote Credit Amount.

retired in 2007. The $10,000 retirement occurred during the age interval between 4½ and 5½ years on the basis that approximately one-half of the amount of property was installed prior to and subsequent to July 1 of each year. That is, on the average, property installed during a year is placed in service at the midpoint of the year for the purpose of the analysis. All retirements also are stated as occurring at the midpoint of a one-year age interval of time, except the first age interval which encompasses only one-half year.

The total retirements occurring in each age interval in a band are determined by summing the amounts for each transaction year-installation year combination for that age interval. For example, the total of $143,000 retired for age interval 4½-5½ is the sum of the retirements entered on Schedule 1 immediately above the stair step line drawn on the table beginning with the 2007 retirements of 2002 installations and ending with the 2016 retirements of the 2011 installations. Thus, the total amount of 143 for age interval 4½-5½ equals the sum of:

10 + 12 + 13 + 11 + 13 + 13 + 15 + 17 + 19 + 20.

In Schedule 2, other transactions which affect the group are recorded in a similar manner. The entries illustrated include transfers and sales. The entries which are credits to the plant account are shown in parentheses. The items recorded on this schedule are not totaled with the retirements, but are used in developing the exposures at the beginning of each age interval.

**Schedule of Plant Exposed to Retirement**

The development of the amount of plant exposed to retirement at the beginning of each age interval is illustrated in Schedule 3 on the following page. The surviving plant at the beginning of each year from 2007 through 2016 is recorded by year in the portion of the table headed "Annual Survivors at the Beginning of the Year." The last amount entered in each column is the amount of new plant added to the group during the year. The amounts entered in Schedule 3 for each successive year following the beginning balance or addition, are obtained by adding or subtracting the net entries

SCHEDULE 3. PLANT EXPOSED TO RETIREMENT JANUARY 1
OF EACH YEAR 2007-2016
SUMMARIZED BY AGE INTERVAL

Experience Band 2007-2016 Placement Band 2002-2016

| Year Placed | Exposures, Thousands of Dollars — Annual Survivors at the Beginning of the Year | | | | | | | | | | Total at Beginning of Age Interval | Age Interval |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| 2002 | 255 | 245 | 234 | 222 | 209 | 195 | 239 | 216 | 192 | 167 | 167 | 13½-14½ |
| 2003 | 279 | 268 | 256 | 243 | 228 | 212 | 194 | 174 | 153 | 131 | 323 | 12½-13½ |
| 2004 | 307 | 296 | 284 | 271 | 257 | 241 | 224 | 205 | 184 | 162 | 531 | 11½-12½ |
| 2005 | 338 | 330 | 321 | 311 | 300 | 289 | 276 | 262 | 242 | 226 | 823 | 10½-11½ |
| 2006 | 376 | 367 | 257 | 346 | 334 | 321 | 307 | 267 | 280 | 261 | 1,097 | 9½-10½ |
| 2007 | 420[a] | 416 | 407 | 397 | 386 | 374 | 361 | 347 | 332 | 316 | 1,503 | 8½-9½ |
| 2008 | | 460[a] | 455 | 444 | 432 | 419 | 405 | 390 | 374 | 356 | 1,952 | 7½-8½ |
| 2009 | | | 510[a] | 504 | 492 | 479 | 464 | 448 | 431 | 412 | 2,463 | 6½-7½ |
| 2010 | | | | 580[a] | 574 | 561 | 546 | 530 | 501 | 482 | 3,057 | 5½-6½ |
| 2011 | | | | | 660[a] | 653 | 639 | 623 | 628 | 609 | 3,789 | 4½-5½ |
| 2012 | | | | | | 750[a] | 742 | 724 | 685 | 663 | 4,332 | 3½-4½ |
| 2013 | | | | | | | 850[a] | 841 | 821 | 799 | 4,955 | 2½-3½ |
| 2014 | | | | | | | | 960[a] | 949 | 923 | 5,719 | 1½-2½ |
| 2015 | | | | | | | | | 1,080[a] | 1,069 | 6,579 | ½-1½ |
| 2016 | | | | | | | | | | 1,220[a] | 7,490 | 0-½ |
| Total | 1,975 | 2,382 | 2,824 | 3,318 | 3,872 | 4,494 | 5,247 | 6,017 | 6,852 | 7,799 | 44,780 | |

[a] Additions during the year.

shown on Schedules 1 and 2. For the purpose of determining the plant exposed to retirement, transfers-in are considered as being exposed to retirement in this group at the beginning of the year in which they occurred, and the sales and transfers-out are considered to be removed from the plant exposed to retirement at the beginning of the following year. Thus, the amounts of plant shown at the beginning of each year are the amounts of plant from each placement year considered to be exposed to retirement at the beginning of each successive transaction year. For example, the exposures for the installation year 2006 are calculated in the following manner:

| | | |
|---|---|---|
| Exposures at age 0 | = amount of addition | = $750,000 |
| Exposures at age ½ | = $750,000 - $ 8,000 | = $742,000 |
| Exposures at age 1½ | = $742,000 - $18,000 | = $724,000 |
| Exposures at age 2½ | = $724,000 - $20,000 - $19,000 | = $685,000 |
| Exposures at age 3½ | = $685,000 - $22,000 | = $663,000 |

For the entire experience band 2006-2015, the total exposures at the beginning of an age interval are obtained by summing diagonally in a manner similar to the summing of the retirements during an age interval (Schedule 1). For example, the figure of 3,789, shown as the total exposures at the beginning of age interval 4½-5½, is obtained by summing:

255 + 268 + 284 + 311 + 334 + 374 + 405 + 448 + 501 + 609.

**Original Life Table**

The original life table, illustrated in Schedule 4 on the following page, is developed from the totals shown on the schedules of retirements and exposures, Schedules 1 and 3, respectively. The exposures at the beginning of the age interval are obtained from the corresponding age interval of the exposure schedule, and the retirements during the age interval are obtained from the corresponding age interval of the retirement schedule. The retirement ratio is the result of dividing the retirements during the age interval by the exposures at the beginning of the age interval. The percent surviving at the beginning of each age interval is derived from survivor ratios, each of which equals one minus the retirement ratio. The percent surviving is developed by starting with 100% at age zero and successively multiplying the percent

SCHEDULE 4. ORIGINAL LIFE TABLE

CALCULATED BY THE RETIREMENT RATE METHOD

Experience Band 2007-2016 Placement Band 2002-2016

(Exposure and Retirement Amounts are in Thousands of Dollars)

| Age at Beginning of Interval (1) | Exposures at Beginning of Age Interval (2) | Retirements During Age Interval (3) | Retirement Ratio (4) | Survivor Ratio (5) | Percent Surviving at Beginning of Age Interval (6) |
|---|---|---|---|---|---|
| 0.0 | 7,490 | 80 | 0.0107 | 0.9893 | 100.00 |
| 0.5 | 6,579 | 153 | 0.0233 | 0.9767 | 98.93 |
| 1.5 | 5,719 | 151 | 0.0264 | 0.9736 | 96.62 |
| 2.5 | 4,955 | 150 | 0.0303 | 0.9697 | 94.07 |
| 3.5 | 4,332 | 146 | 0.0337 | 0.9663 | 91.22 |
| 4.5 | 3,789 | 143 | 0.0377 | 0.9623 | 88.15 |
| 5.5 | 3,057 | 131 | 0.0429 | 0.9571 | 84.83 |
| 6.5 | 2,463 | 124 | 0.0503 | 0.9497 | 81.19 |
| 7.5 | 1,952 | 113 | 0.0579 | 0.9421 | 77.11 |
| 8.5 | 1,503 | 105 | 0.0699 | 0.9301 | 72.65 |
| 9.5 | 1,097 | 93 | 0.0848 | 0.9152 | 67.57 |
| 10.5 | 823 | 83 | 0.1009 | 0.8991 | 61.84 |
| 11.5 | 531 | 64 | 0.1205 | 0.8795 | 55.60 |
| 12.5 | 323 | 44 | 0.1362 | 0.8638 | 48.90 |
| 13.5 | 167 | 26 | 0.1557 | 0.8443 | 42.24 |
| | | | | | 35.66 |
| Total | 44,780 | 1,606 | | | |

Column 2 from Schedule 3, Column 12, Plant Exposed to Retirement.
Column 3 from Schedule 1, Column 12, Retirements for Each Year.
Column 4 = Column 3 divided by Column 2.
Column 5 = 1.0000 minus Column 4.
Column 6 = Column 5 multiplied by Column 6 as of the Preceding Age Interval.

surviving at the beginning of each interval by the survivor ratio, i.e., one minus the retirement ratio for that age interval. The calculations necessary to determine the percent surviving at age 5½ are as follows:

| | | | | | | |
|---|---|---|---|---|---|---|
| Percent surviving at age 4½ | = | 88.15 | | | | |
| Exposures at age 4½ | = | 3,789,000 | | | | |
| Retirements from age 4½ to 5½ | = | 143,000 | | | | |
| Retirement Ratio | = | 143,000 | ÷ | 3,789,000 | = | 0.0377 |
| Survivor Ratio | = | 1.000 | - | 0.0377 | = | 0.9623 |
| Percent surviving at age 5½ | = | (88.15) | x | (0.9623) | = | 84.83 |

The totals of the exposures and retirements (columns 2 and 3) are shown for the purpose of checking with the respective totals in Schedules 1 and 3. The ratio of the total retirements to the total exposures, other than for each age interval, is meaningless. The original survivor curve is plotted from the original life table (column 6, Schedule 4). When the curve terminates at a percent surviving greater than zero, it is called a stub survivor curve. Survivor curves developed from retirement rate studies generally are stub curves.

**Smoothing the Original Survivor Curve**

The smoothing of the original survivor curve eliminates any irregularities and serves as the basis for the preliminary extrapolation to zero percent surviving of the original stub curve. Even if the original survivor curve is complete from 100% to zero percent, it is desirable to eliminate any irregularities, as there is still an extrapolation for the vintages which have not yet lived to the age at which the curve reaches zero percent. In this study, the smoothing of the original curve with established type curves was used to eliminate irregularities in the original curve.

The Iowa type curves are used in this study to smooth those original stub curves which are expressed as percents surviving at ages in years. Each original survivor curve was compared to the Iowa curves using visual and mathematical matching in order to determine the better fitting smooth curves. In Figures 6, 7, and 8, the original curve developed in Schedule 4 is compared with the L, S, and R Iowa type curves which most nearly fit the original survivor curve. In Figure 6, the L1 curve with an

average life between 12 and 13 years appears to be the best fit. In Figure 7, the S0 type curve with a 12-year average life appears to be the best fit and appears to be better than the L1 fitting. In Figure 8, the R1 type curve with a 12-year average life appears to be the best fit and appears to be better than either the L1 or the S0.

In Figure 9, the three fittings, 12-L1, 12-S0 and 12-R1 are drawn for comparison purposes. It is probable that the 12-R1 Iowa curve would be selected as the most representative of the plotted survivor characteristics of the group.

FIGURE 6. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN L1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

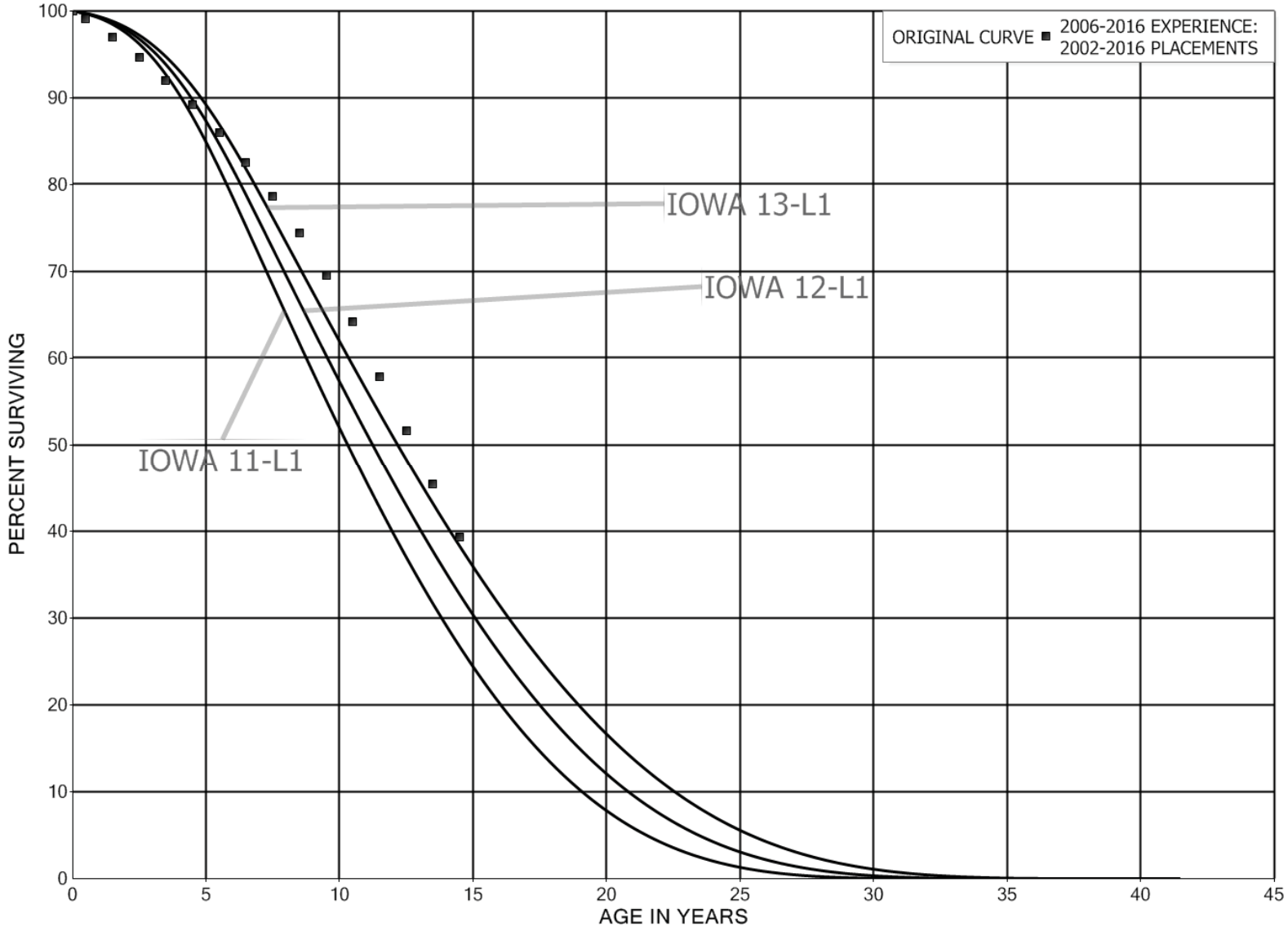


FIGURE 7. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN S0 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

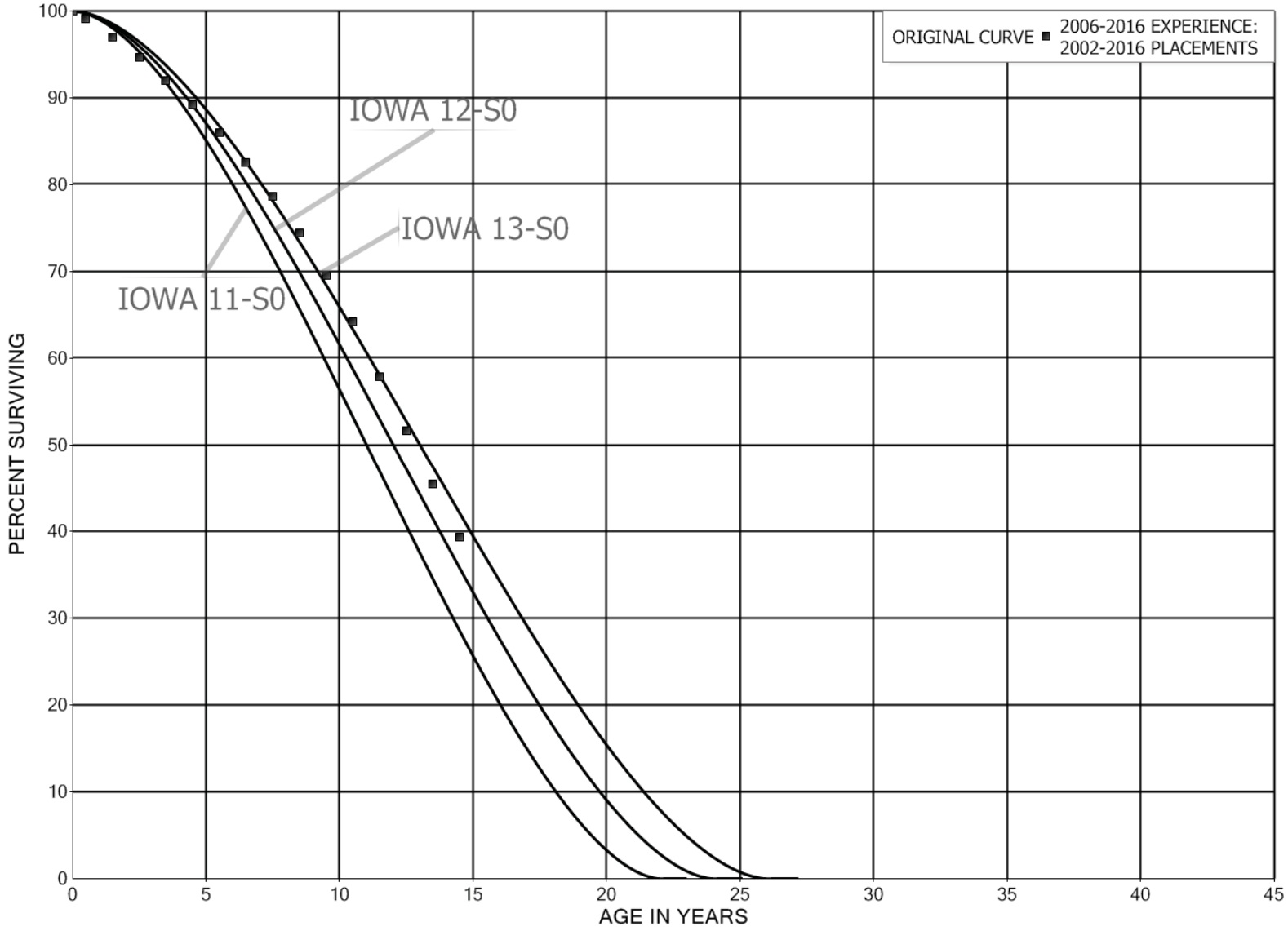


FIGURE 8. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN R1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

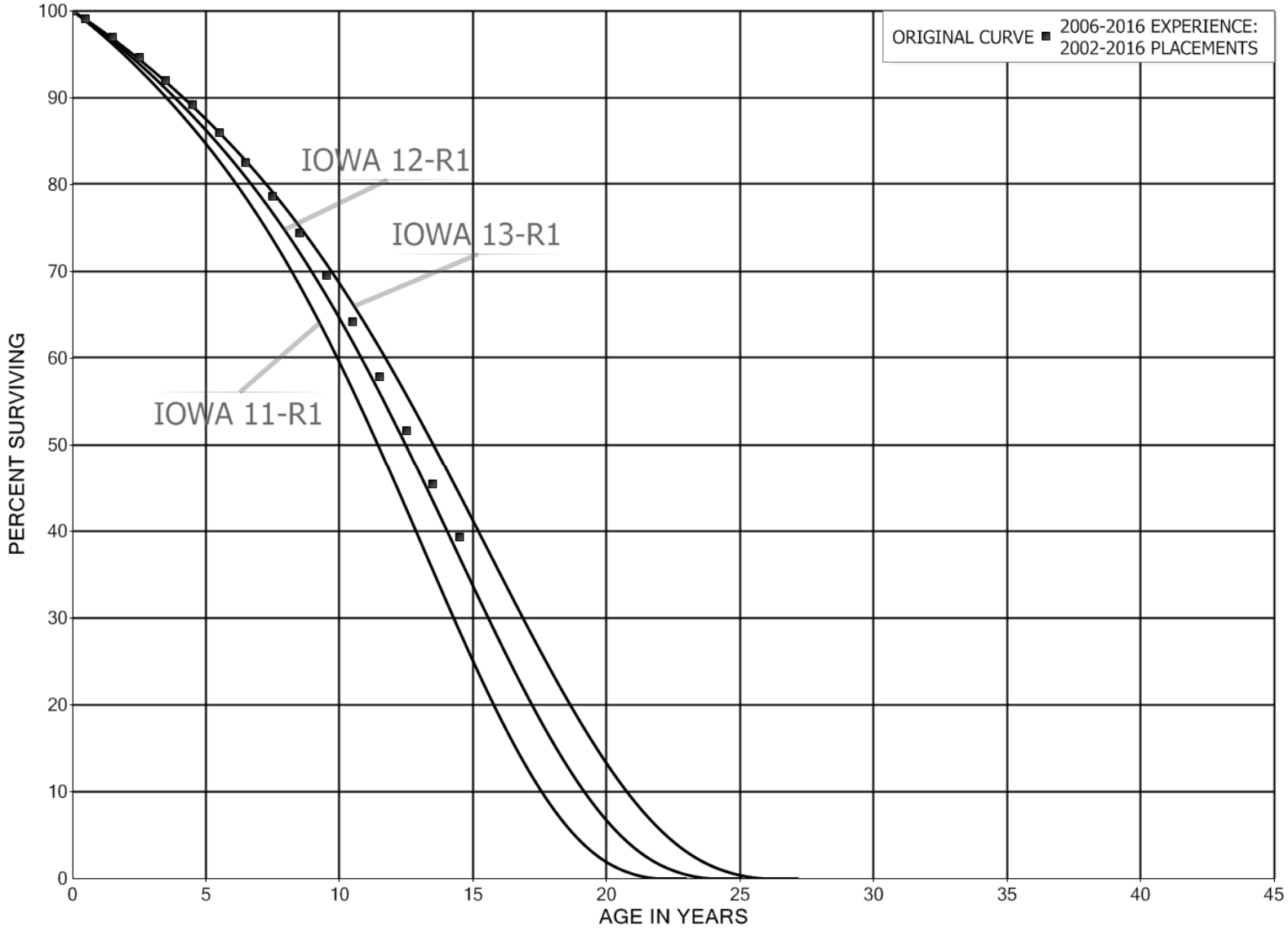
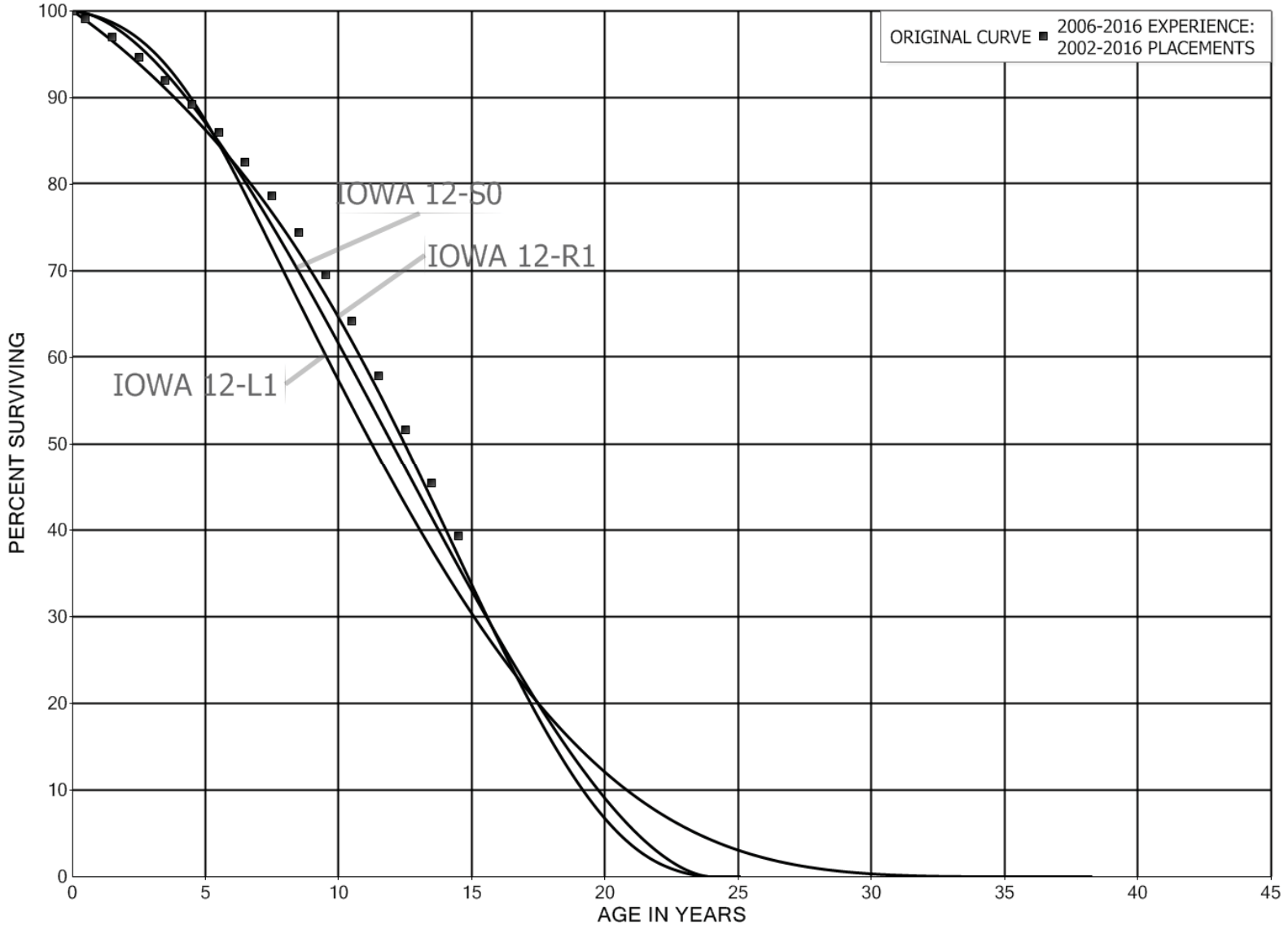


FIGURE 9. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN L1, S0 AND R1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES



**CONCENTRIC ADVISORS ULC**

Suite 277 • 200 Rivercrest Drive S.E. • Calgary, AB T2C 2X5 • Canada
t: 403.257.5946 • f: 403.257.5947

**Exhibit 12 - Automatic Return on Equity Adjustment Report**

# Automatic Return on Equity Adjustment

## Newfoundland and Labrador Hydro

June 2017

*A Report to the Board of Commissioners of Public Utilities*

newfoundland labrador hydro
a nalcor energy company

# Table of Contents

1.0 Overview ..... 1

2.0 Flow-through of Adjustment to Return on Equity ..... 1

2.1 Adjustment to Return on Equity and Weighted Average Cost of Capital ..... 1

2.2 Adjustment to Revenue Requirement for Rate Setting ..... 1

3.0 Allocation of Revised Revenue Requirement ..... 2

4.0 Revisions to Customer Rates ..... 3

5.0 Revisions to Excess Earnings Account Definition ..... 4

6.0 Implementation Process ..... 4

7.0 Conclusion ..... 5

# 1.0 Overview

In Board Order No. P.U. 49(2016), the Board of Commissioners of Public Utilities (the Board) determined that Newfoundland and Labrador Hydro's (Hydro) target return on equity should be subject to an adjustment process in the years between General Rate Applications (GRAs) so that it continues to be the same as Newfoundland Power's return on equity. As such, it directed Hydro to file a proposal in relation to an adjustment mechanism for its target return on equity.

This report provides an overview of the calculation of the adjustment to return on equity, the allocation of the adjustment to various customers, the required adjustment to customer rates to reflect the change in revenue requirement, and any process related matters to implement the rate adjustment.

# 2.0 Flow-through of Adjustment to Return on Equity

## 2.1 Adjustment to Return on Equity and Weighted Average Cost of Capital

Upon the delivery of an order to change Newfoundland Power's rate of return on equity, Hydro would be required to update its return on equity to be equal to that of Newfoundland Power. This change would, in turn, cause a change in Hydro's weighted average cost of capital and return on rate base. For illustrative purposes, Hydro's 2015 Test Year weighted average cost of capital (WACC) for rate setting would reduce from 6.61% to 6.56% if the approved Test Year return on equity was revised from 8.50% to 8.25%.

Appendix A to this report provides the calculation showing the impact on WACC and return on rate base of 25 basis point reduction in the Test Year return on equity based on the illustrative change in return on equity noted above.

## 2.2 Adjustment to Revenue Requirement for Rate Setting

To reflect a revised return on rate base in customer rates and ensure that Hydro's rates reflect the same return on equity as Newfoundland Power would require Hydro to calculate a revised

Test Year revenue requirement for rate setting. Using the illustrative change in return on equity noted in section 2.1, a reduction of 5 basis points in return on rate base would reduce Hydro's revenue requirement to be recovered through customer rates by $964,000, or approximately 0.17% of the approved 2015 Test Year revenue requirement from customer rates.

The calculation of the revised Test Year revenue requirement was derived by updating the Test Year rate of return on rate base (as provided in Appendix A) in the calculation of the revised Test Year return on rate base. Finance schedules showing the derivation of the revised 2015 Test Year revenue requirement for rate setting reflecting the illustrative change from 8.50% return on equity to 8.25% return on equity is provided in Appendix B.

## 3.0 Allocation of Revised Revenue Requirement

In order to allocate the return on equity adjustment amongst customer groups, Hydro would be required to revise its approved Test Year cost of service for rate setting to reflect the revised Test Year return on rate base. Doing so would provide revised Test Year revenue requirements by class consistent with the approved cost of service methodology for the most recently approved Test Year. As Hydro would be revising the approved Test Year cost of service study, Hydro would submit a revised Test Year cost of service study for Board approval reflecting the revised return on equity approved for Newfoundland Power.

Table 1 provides the impact of 25 basis point return on equity decrease on 2015 Test Year revenue requirement by rate class.

**Table 1**

**Allocation of Revised Revenue Requirement**

| Customer Group | Approved 2015 Test Year Revenue Requirement ($000) | Revised 2015 Test Year Revenue Requirement ($000) | Change ($000) | Change (%) |
|---|---|---|---|---|
| Newfoundland Power – Incl. Rural Deficit | 443,366 | 442,515 | (851) | (0.19) |
| Island Industrial | 34,829 | 34,776 | (53) | (0.15) |
| Labrador Industrial | 5,218 | 5,210 | (8) | (0.15) |
| CFB Goose Bay Secondary | 932 | 932 | 0 | 0.00 |
| Hydro Rural Labrador Int. – Incl. Rural Deficit | 20,169 | 20,117 | (52) | (0.26) |
| Rural Revenues from Deficit Areas | 60,851 | 60,851 | 0 | 0.00 |
| **Total** | **565,365** | **564,401** | **(964)** | **(0.17)** |

Table 1 allocates the reduced Rural Deficit of $203,000 resulting from the reduction in the Test Year return on rate base to Newfoundland Power and the Hydro Rural Labrador Interconnected customers.

## 4.0 Revisions to Customer Rates

Hydro would follow the Board's most recently approved rate design approach in computing proposed rates to recover the revised Test Year revenue requirement.

For Newfoundland Power, the second block energy rate is currently set based on the Test Year price of Holyrood fuel and the demand charge is negotiated. Therefore, Hydro would propose that changes to the Test Year revenue requirement allocated to Newfoundland Power would be applied through a change in the first block rate.

The Island Industrial Customers' rates for demand, energy, and specifically assigned charges currently are an output from the approved Test Year cost of service study. Hydro proposes to use this same approach, using the Revised Test Year cost of service study, for Island Industrial

Customer rate design. For Hydro Rural Labrador Interconnected and Labrador Industrial Transmissions customers, Hydro proposes to adjust customer rates by applying the percentage change in Test Year revenue requirement for each class of service.

Hydro Rural rates would be required to change when Newfoundland Power's return changes to ensure its customers receive the same rates as Newfoundland Power regardless of whether Hydro changed its return on equity, so there would be no change in existing process for these customers.

With an automatic update to Hydro's Test Year revenue requirement due to a change in the return on equity from Newfoundland Power, the process for implementation of compliance rates reflecting a Newfoundland Power GRA would be required to change. The compliance application for Newfoundland Power would also need to reflect the revised supply cost from Hydro as a result of any required change in the approved return on equity for Hydro. Therefore, Hydro's compliance application in response to the establishment of a revised return on equity would need to be filed prior to Newfoundland Power filing its application to establish customer rates.

## 5.0 Revisions to Excess Earnings Account Definition

As Hydro's rate of return on rate base would be impacted by a change of return on equity, Hydro would be required to revise its Excess Earnings Account definition to reflect the revised rate of return on rate base.

## 6.0 Implementation Process

Hydro proposes that it would file an automatic adjustment application with the Board within 10 business days following the publication of a Board Order approving Newfoundland Power's return on equity. Hydro's application would include the following:

- Revised Test Year weighted average cost of capital and rate of return on rate base to reflect return on equity equal to that approved for Newfoundland Power;

- Finance schedules providing revised requirement from customer rates;
- Revised test year cost of service study identifying change in revenue requirement by customer class;
- Derivation of revised customer rates;
- Revised Excess Earnings Account Definition; and
- Proposed revised schedule of rates, toll and charges.

## 7.0 Conclusion

Board Order No. P.U. 49(2016) directed Hydro to file a proposal in relation to an adjustment mechanism for its target return on equity to reflect any future changes to Newfoundland Power's approved target return on equity for rate setting.[1] Hydro submits that the proposal outlined in this document addresses the Board's order and provides a reasonable approach by which Hydro can ensure its Test Year return on equity reflected in customer rates remains the same as that of Newfoundland Power.

[1] Page 24 of Order No. P.U. 49(2016).

## Sample Calculation of Revised Weighted Average Cost of Capital

| **Regulated Average Capital Structure** | **Test Year (%)** |
|---|---|
| Debt | 74.2 |
| Asset retirement obligation | 0.6 |
| Employee future benefits | 3.9 |
| Equity | 21.2 |
| **Total** | **100.0** |

| **Weighted Average Cost of Capital**[1] | **Test Year (%)** | **Revised (%)** |
|---|---|---|
| Embedded cost of debt | 6.47 | 6.47 |
| Asset retirement obligation | 0.00 | 0.00 |
| Employee future benefits | 0.00 | 0.00 |
| Equity | 8.50 | 8.25 |
| **Weighted Average Cost of Capital** | **6.61** | **6.56** |

[1] Hydro's rate of return on rate base is equal to its approved weighted average cost of capital.

**Sample Finance Schedules**
**Newfoundland and Labrador Hydro**
**Financial Results and Forecasts**
**Statement of Income and Retained Earnings**
**($000s)**

| | | Rate Setting Test Year | Automatic ROE Adjustment (Year) | Revised Rate Setting Test Year |
|---|---|---|---|---|
| 1 | **Revenue** | | | |
| 2 | Energy sales | 564,002 | (964) | 563,038 |
| 3 | Revenue deficiency | - | - | - |
| 4 | Other revenue | 2,508 | - | 2,508 |
| 5 | **Total revenue** | 566,510 | (964) | 565,546 |
| 6 | | | | |
| 7 | **Expenses** | | | |
| 8 | Operating expenses | 131,350 | - | 131,350 |
| 9 | Other Income and expense | 4,074 | - | 4,074 |
| 10 | Fuels | 187,464 | - | 187,464 |
| 11 | Power purchases | 62,827 | - | 62,827 |
| 12 | Amortization | 63,230 | - | 63,230 |
| 13 | Accretion of asset retirement obligation | 748 | - | 748 |
| 14 | Interest | 89,453 | - | 89,453 |
| 15 | **Total expenses** | 539,145 | - | 539,145 |
| 16 | | | | |
| 17 | **Net income** | 27,364 | (964) | 26,400 |
| 18 | | | | |
| 19 | **Retained earnings** | | | |
| 20 | Balance at beginning of year | 259,556 | - | 259,556 |
| 21 | Opening adjustment - retained earnings | - | - | - |
| 22 | Dividends | - | - | - |
| 23 | **Balance at end of year** | 286,920 | (964) | 285,956 |

**Sample Finance Schedules**
**Newfoundland and Labrador Hydro**
**Financial Results and Forecasts**
**Rate of Return on Rate Base**
**($000s)**

| | | Rate Setting Test Year | Automatic ROE Adjustment (Year) | Revised Rate Setting Test Year |
|---|---|---|---|---|
| 1 | **Property, plant, and equipment** | 1,882,883 | - | 1,882,883 |
| 2 | add: accumulated depreciation | 204,001 | - | 204,001 |
| 3 | add: contributions in aid of construction | 17,936 | - | 17,936 |
| 5 | less: work in progress | (240,977) | - | (240,977) |
| 6 | **Capital assets in service** | 1,863,843 | - | 1,863,843 |
| 7 | less: asset retirement obligation | (12,169) | - | (12,169) |
| 8 | less: contributions in aid of construction | (17,936) | - | (17,936) |
| 9 | less: accumulated depreciation | (203,834) | - | (203,834) |
| 10 | **Capital assets - current year** | 1,629,904 | - | 1,629,904 |
| 11 | **Capital assets - previous year** | 1,610,437 | - | 1,610,437 |
| 12 | Unadjusted capital assets - average | 1,620,170 | - | 1,620,170 |
| 13 | less: Average net assets not in use | (7,318) | - | (7,318) |
| 14 | **Capital assets - average** | 1,612,852 | - | 1,612,852 |
| 15 | | | | |
| 16 | Cash working capital allowance | 7,037 | - | 7,037 |
| 17 | Fuel | 47,398 | - | 47,398 |
| 18 | Materials and supplies | 27,402 | - | 27,402 |
| 19 | Deferred charges | 95,132 | - | 95,132 |
| 20 | less: Deferred Charges not in use | (4,467) | - | (4,467) |
| 21 | | | | - |
| 22 | **Average rate base** | 1,785,353 | - | 1,785,353 |
| 23 | | | | |
| 24 | Unadjusted return on regulated equity | 27,364 | (964) | 26,400 |
| 25 | add: Cost of service exclusions | 1,177 | - | 1,177 |
| 26 | Interest | 89,453 | - | 89,453 |
| 27 | **Return on rate base** | 117,994 | (964) | 117,030 |
| 28 | | | | |
| 29 | **Rate of return on rate base** | 6.61% | -0.05% | 6.56% |

**Sample Finance Schedules**
**Newfoundland and Labrador Hydro**
**Financial Results and Forecasts**
**Capital Structure**
**($000s)**

| | | Rate Setting Test Year | Automatic ROE Adjustment (Year) | Revised Rate Setting Test Year |
|---|---|---|---|---|
| 1 | **Regulated capital structure** | | | |
| 2 | Long-term debt | 1,649,544 | - | 1,649,544 |
| 3 | Promissory notes | - | - | - |
| 4 | Promissory notes - related party | - | - | - |
| 5 | less: sinking funds | (238,850) | - | (238,850) |
| 6 | add: mark to market of sinking funds | 31,071 | - | 31,071 |
| 7 | | 1,441,765 | - | 1,441,765 |
| 8 | Cost of service exclusions | - | | - |
| 9 | Non-regulated debt pool | (8,187) | - | (8,187) |
| 10 | Net regulated debt | 1,433,578 | - | 1,433,578 |
| 11 | Asset retirement obligation | 20,740 | - | 20,740 |
| 12 | less: unfunded asset retirement obligation | (8,493) | - | (8,493) |
| 13 | Employee future benefits | 72,454 | - | 72,454 |
| 14 | Contributed capital | 100,000 | - | 100,000 |
| 15 | Retained earnings cost of service exclusions | 2,154 | - | 2,154 |
| 16 | Retained earnings | 286,920 | (964) | 285,956 |
| 17 | **Total** | 1,907,353 | (964) | 1,906,389 |
| 18 | | | | |
| 19 | **Regulated capital structure (%)** | | | |
| 20 | Debt | 75.2% | - | 75.2% |
| 21 | Asset retirement obligation | 0.6% | - | 0.6% |
| 22 | Employee future benefits | 3.8% | - | 3.8% |
| 23 | Equity | 20.4% | - | 20.4% |
| 24 | **Total** | 100.0% | - | 100.0% |
| 25 | | | | |
| 26 | **Regulated average capital structure (%)** | | | |
| 27 | Debt | 74.2% | - | 74.2% |
| 28 | Asset retirement obligation | 0.6% | - | 0.6% |
| 29 | Employee future benefits | 3.9% | - | 3.9% |
| 30 | Equity | 21.2% | - | 21.2% |
| 31 | **Total** | 100.0% | - | 100.0% |
| 32 | | | | |
| 33 | **Weighted average cost of capital (WACC)** | | | |
| 34 | Embedded cost of debt | 6.47% | - | 6.47% |
| 35 | Asset retirement obligation | 0.00% | - | 0.00% |
| 36 | Employee future benefits | 0.00% | - | 0.00% |
| 37 | Equity | 8.50% | -0.25% | 8.25% |
| 38 | **WACC** | 6.61% | | 6.56% |

**Exhibit 13 - Cost of Service Expert Evidence**

CHRISTENSEN ASSOCIATES ENERGY CONSULTING

# Testimony of Bruce R. Chapman

*regarding*

## Cost-of-Service Methodology Issues

*to be reviewed in*

**Newfoundland and Labrador Hydro's**
**2017 General Rate Application**

*prepared by*

**Christensen Associates Energy Consulting, LLC**
**800 University Bay Drive, Suite 400**
**Madison, WI 53705-2299**
**Voice 608.231.2266 Fax 608.231.2108**

**July 5, 2017**

## Table of Contents

**EXECUTIVE SUMMARY** ..... I

**1. INTRODUCTION** ..... 1

**2. BACKGROUND OF WITNESS** ..... 3

**3. ISSUE #1. ALLOCATION OF O&M EXPENSES RELATED TO DEDICATED TRANMISSION ASSETS** ..... 4

**4. ISSUE #2. CBPP FREQUENCY CONVERTER COST ASSIGNMENT** ..... 12

**5. ISSUE #3. CBPP PILOT PROJECT** ..... 16

**6. ISSUE #4. ALLOCATION OF THE RURAL DEFICIT** ..... 21

**7. ISSUE #5. CLASSIFICATION OF PURCHASES OF WIND GENERATION** ..... 26

**APPENDIX 1: SUMMARY OF RECOMMENDATIONS** ..... 32

**EXHIBIT BRC 1. RESUME OF BRUCE R. CHAPMAN** ..... 34

**EXHIBIT BRC 2. MEMORANDUM RE O&M COSTS FOR SPECIFICALLY ASSIGNED ASSETS** ..... 35

**Testimony of Bruce R. Chapman**

*regarding*

**Cost-of-Service Methodology Issues**

*to be reviewed in*

**Newfoundland and Labrador Hydro's**
**2017 General Rate Application**

*prepared by*

**CHRISTENSEN ASSOCIATES ENERGY CONSULTING, LLC**

July 5, 2017

## EXECUTIVE SUMMARY

This testimony, prepared by Mr. Bruce Chapman of Christensen Associates Energy Consulting, LLC, of Madison, WI, USA, reviews five costing methodology issues that Newfoundland and Labrador Hydro wish to submit for review in this General Rate Application. These issues are:

- The method to determine the operating and maintenance (O&M) costs related to specifically assigned assets.
- The specific assignment of the frequency converter costs to Corner Brook Pulp and Paper (CBPP).
- The CBPP pilot project that permits flexible operation of site generation through waiver of peak demand limitations.
- The allocation of the Rural Deficit.
- The classification of purchase costs of wind generation.

This review does not address issues related to the transition to interconnection with eastern North America. Such issues will be addressed in a separate proceeding expected to occur in the Fall of 2018.

Issue #1. O&M Costs Related to Dedicated Transmission Assets

**Issue.** Hydro has reviewed the Industrial customers' concern about O&M costing methods associated with dedicated transmission assets. Original cost appears to have several counterintuitive features. Using a measure based on current cost appears to be computationally feasible, although more challenging than the current method, and to yield superior results.

**Recommendations.**

- We recommend that Hydro continue to directly assign O&M costs to specifically assigned assets in determining specifically assign charges for Industrial customers.
- To determine the allocation of O&M to specifically assigned assets, we recommend that Hydro determine test-year transmission asset values via Handy-Whitman indexes (the current-year approach) to alleviate the current problem of inadvertently allocating higher O&M costs to newer assets and lower O&M costs to older assets.
- We also recommend that Hydro's previous proposal that A&G expenses be directly assigned in the same proportion as O&M expenses be approved in conjunction with the above recommendations.

Issue #2. CBPP Frequency Converter Cost Assignment

**Issue.** Hydro and CBPP differ as to the benefits that the frequency converter conveys on the Hydro system. Hydro believes that benefits are almost entirely confined to the customer site and that the costs related to the frequency converter should be assigned directly to the customer.

**Recommendation.**

- We recommend that the frequency converter unit continue to be assigned directly to CBPP, due to its apparent use almost solely by the customer and the availability of compensation for service to the system that is provided from time to time.

Issue #3. CBPP Pilot Project

**Issue.** Hydro is proposing to terminate the project, which allows CBPP to avoid having to engage in load following with its own generation to minimize peak demand.

**Recommendations.**

- We recommend that Hydro not offer to renew the pilot project in the 2017 GRA given the anticipated reduction in the value of energy services that CBPP is likely to be able to provide to the system following completion of the LIL and, subsequently, Muskrat Falls.

- We also recommend that Hydro broach with CBPP the idea of two-part pricing, specifically real-time pricing, as a replacement for its current pilot project and associated Capacity Assistance agreements.

Issue #4. Rural Deficit

**Issue.** In its 2013 GRA, Hydro proposed a revised rural deficit allocation method based on revenue requirements and the Board approved that method. However, in the 2013 GRA Order, the Board stated it expects that Hydro will address the rural deficit allocation methodology in its cost of service report and all parties will have further opportunity to provide input as part of the review of that report.[1]

**Recommendation.**

- We recommend that Hydro continue to utilize the rural deficit allocation method based on revenue requirements. The criterion of equalizing revenue-to-cost ratios across regions and the concomitant avoidance of price distortion appear to be desirable features of this approach. The relative simplicity of the calculation method, when compared with the existing approach, is an additional advantage.

Issue #5. Classification of Wind Generation

**Issue.** Hydro views the wind generation that it purchases as lacking capacity value for planning purposes. Hydro proposed, in its Amended 2013 GRA submission, to classify all wind purchases costs as 100% energy-related. Industry practice often confers some capacity value on wind in cost allocation. A combination of wind capacity factors and utility generation classification methods leads to demand classification of about 9 to 20%.

[1] See Order No. P.U. 49(2016), page 105, lines 20-22.

**Recommendation.**

- We recommend that Hydro's planning perspective for classification of purchases of wind generation be accepted by the Board. An energy-only classification approach is plausible and defensible based on Hydro's planning perspective regarding wind generation. If Hydro's planners had concluded that wind had a capacity role for planning purposes, then classification methods and results in other jurisdictions would have had weight in considering classification shares.

## 1. INTRODUCTION

The Order of the Newfoundland and Labrador Board of Public Utilities (Board or PUB) closing Newfoundland and Labrador Hydro's (Hydro's) General Rate Application (GRA) for test years 2014 and 2015 states that Hydro committed to review with interested parties several outstanding cost-of-service (COS) methodology issues. While most of these will be discussed in a proceeding for this purpose before completion of the Muskrat Falls (MF) Project (consisting of the generation project and its related transmission projects) some topics have been deemed worthy of review in this GRA. The Board's 2013 GRA Order specifically mentions "the generation credit agreement between Hydro and Corner Brook Pulp and Paper (CBPP), the methodology for assignment of specifically assigned assets and the allocation of associated costs to those assets, and the approach to CDM cost allocation and recovery."[2] (Hydro is currently proposing to defer the CDM issue to a later proceeding. As a result, this testimony offers no arguments regarding the allocation of CDM costs.) In addition to the remaining issues, Hydro wishes to submit for PUB and intervenor consideration its views on three more issues: 1) assignment of the CBPP frequency converter's costs to the customer; 2) the cost allocation of the rural deficit; and 3) the classification of wind generation costs.

In 2015 Hydro requested that Christensen Associates Energy Consulting (CA Energy Consulting) conduct the aforementioned review of the utility's cost-of-service (COS)

[2] PUB Order No. P.U. 49(2016), P. 95.

methodology, focusing on the system that is likely to emerge following its transition to integration with the electricity grid of eastern North America. CA Energy Consulting submitted a report to Hydro dated March 31, 2016, covering the utility's anticipated methodology issues following the transition. The COS review process is expected to occur in the Fall of 2018. Hence the PUB's and Hydro's interest in review of pressing COS methodology issues not likely to be materially affected by the transition in this GRA. (In cases in which the transition might affect the issues currently under discussion, we provide mention of this consideration.)

Accordingly, this testimony draws upon our report and information prepared since its release to review and provide recommendations on five issues before the PUB for this GRA. These issues are:

- The method to determine the O&M costs related to specifically assigned assets.
- The specific assignment of the frequency converter costs to CBPP.
- The CBPP pilot project that permits flexible operation of site generation through waiver of peak demand limitations.
- The allocation of the Rural Deficit.
- The classification of purchase costs from wind generation.

The testimony reviews these issues after a brief description of witness Chapman's background. The testimony closes with a summary of the recommendations. Exhibits follow the testimony. Exhibit BRC 1 offers witness Chapman's resume. Exhibit BRC 2 provides a memorandum to Hydro prepared by CA Energy Consulting that documents North American

practices with respect to O&M cost allocation in cases of direct assignment of transmission assets.

## 2. BACKGROUND OF WITNESS

This testimony has been prepared by Mr. Bruce R. Chapman, a Vice President at Christensen Associates Energy Consulting, LLC. He has been employed by the firm in positions of increasing responsibility since 1986. Mr. Chapman focuses on utility costing and pricing assignments, including cost-of-service (COS) methodology reviews and COS studies, and rate design, both traditional and innovative. Related costing work includes reviews of distribution cost classification methods, loss factor development, load research analysis, among others. He has undertaken rate reviews of entire utility portfolios as well as designs of specific rates. Innovative rate design assignments include real-time pricing, critical-peak pricing, interruptible/curtailable rate design, fixed bill analysis, reviews of standby and distributed energy resource pricing structures, among others. Mr. Chapman regularly conducts training sessions in utility costing and pricing and has published articles in Electricity Journal and Natural Gas & Electricity. Mr. Chapman holds a Master's degree in Economics from the University of Wisconsin-Madison.

## 3. ISSUE #1. ALLOCATION OF O&M EXPENSES RELATED TO DEDICATED TRANMISSION ASSETS

**Issue.** Four Island Industrial Customers are assigned a number of specific charges because each of the customers is served by assets that are deemed to serve them alone.[3] The central issue, identified in the most recent GRA, pertains to the allocation of O&M costs. Currently O&M costs are allocated to these customers based on asset share, with asset value defined in terms of original cost. Periodic investment in new or upgraded facilities results in variation in shares over time across customers due to variations in age of plant.

In the 2013 GRA Order, the Board stated: "Hydro should address this issue more fully in its upcoming general rate application to be filed in 2017, providing supporting documentation on available alternatives and the impacts of each, and information on practices in other jurisdictions if applicable."[4]

**Background.** The issues surrounding specific cost assignment have grown as the size of the charges has increased. Specifically Assigned Charges to Island Industrial Customers for the 2007 Test Year were $0.7 million while those approved for the 2015 Test Year were $1.7 million, spread across four customers: CBPP, North Atlantic Refining, Ltd. (NARL), Teck Resources (Teck), and Vale Newfoundland and Labrador Limited (Vale).[5] O&M, depreciation

[3] Costs are also specifically assigned to Newfoundland Power for lines and terminal stations that connect them to the Hydro grid. Hydro's definition of specifically assigned plant is "that equipment and those facilities which are owned by Hydro and used to serve the customer only." NLH *2013 Amended General Rate Application*, Schedule A, Article 1.01(ee).

[4] Source: Order No. P.U. 49(2016), page 98, lines 30-33.

[5] Vale was connected in 2012 and does not currently pay a specifically assigned charge.

expense, and return on debt and equity are the bulk of the charges, in declining order, with O&M constituting somewhat more than half in aggregate. Customers who paid for their assigned assets through contributions in aid of construction (CIAC) pay for Test Year allocated O&M costs only.

The assets that generate the charges are solely transmission-related, consisting mostly of lines and terminal stations that connect the customers to the grid. The CBPP facility is different from the others in that the customer has some facilities that operate at 50 Hz instead of the 60 Hz common to the rest of the grid. Additionally, the customer has a small hydro plant that provides generation services to its site. Issues related to the frequency converter that transforms 50 Hz power into 60 Hz are discussed in the section covering issue #3.

Assignment of a share of O&M expenses to the Island Industrial class and to its customers requires use of a sharing mechanism applied to total O&M. The basis for identifying O&M costs assigned to the customer group is the group's share of transmission plant in service, with plant valued at original cost. Similarly, allocation of O&M assigned to these four customers is based on their shares of transmission assets, again valued at original cost.[6]

**Analysis.** Some United States (U.S.) jurisdictions deem virtually all transmission assets, including connections to large customers, as common property, to be allocated by the utility's transmission cost allocation rule. These utilities tend to be large, with the result that

[6] Hydro also specifically assigns some costs to Newfoundland Power, but these costs are not separately identified in a specifically assigned charge. These costs are not a subject of discussion in this proceeding.

no single customer is a significant share of total sales and no assets that might be directly assigned are a significant share of the total. For example, Georgia Power Company has many large customers, but the utility does not engage in direct assignment of transmission costs because the system as a whole has a capacity of over 17,000 MW. Smaller utilities that serve one or more customers whose loads are an appreciable share of total sales are more likely than other utilities to engage in direct assignment of transmission costs in cases in which the transmission assets serve the individual customer only.

This perspective is borne out by research that CA Energy Consulting conducted early this year. The resulting memorandum appears as Exhibit BRC 2 to this testimony. That memorandum reviewed Canadian and U.S. treatment of O&M related to dedicated transmission assets. The investigation found that direct assignment is relatively more common in Canada than in the U.S. We found five Canadian utilities that directly assign transmission assets serving individual customers to those customers. We found four U.S. investor-owned utilities, one federally-owned utility (Bonneville Power) and three municipal/public power district utilities who engage in direct assignment. While the inquiry was not systematic, it was clear from telephone interviews that the practice is not widespread in the U.S.

The utilities engaging in direct assignment do not appear to have a single dominant approach to the treatment of O&M related to these dedicated transmission facilities. Large Canadian and U.S. utilities often bundle these costs with other transmission costs and allocate such common costs using the utility's transmission cost allocator. For example, Xcel

Energy in Minnesota simply allocates all its transmission-related O&M costs on the basis of the CP allocator that it uses for transmission expenses generally. This approach is arguably less precise in allocating O&M costs to direct assignment customers but likely avoids swings in O&M charges to those customers in response to equipment upgrades.

Other large utilities develop a means of sharing directly assigned costs across direct assignment customers, with sharing usually based on original asset cost. Smaller U.S. firms directly assigned either actual or estimated costs of each facility to the customer that the facility serves.

Hydro may fit the pattern of utilities that directly assign assets by having significant assignable transmission assets, although it is clearly not similar to the small U.S. public power districts. The Industrial customers with directly assigned transmission assets consume about 9% of Island sales at present and were assigned about 11% of transmission assets in 2015.[7]

During Hydro's 2013 GRA, one customer, (Vale) responsible for roughly $500,000 of directly assigned costs for the 2015 Test Year, proposed an improvement to the determination of O&M charges for specifically assigned assets. Their expert, Mr. Melvin Dean, advocated and set out the steps for development of allocation based on current cost.[8] This technique

[7] Based on 2013 Amended GRA COS Study. Sales share: Schedule 1.3.2, column 3, page 1 of 3, (Exhibit 13, p. 17 of 109) Asset share: Schedule 2.2A, line 22 (Exhibit 13, p. 26 of 109.)

[8] Melvin Dean, *Expert's Report on Newfoundland and Labrador Hydro's Amended General Rate Application*, June 4, 2015, p. 3*ff*.

makes use of Handy-Whitman indexes, which are available for sufficiently detailed segments of the electric utility industry to produce reliable cost indexation over many years.

Hydro investigated Vale's proposed approach and found it to be feasible.[9] The utility also found that the outcome of its calculations confirmed Mr. Dean's belief: the relatively newer transmission assets directly assigned to customers, when compared with other transmission assets, produced a reduced O&M cost allocation for the direct assignment customers.[10]

This approach has a parallel in distribution cost classification. Minimum system studies classify the minimum system needed by a utility as customer-related and the remainder as demand-related. Such computations resort to conversion of assets to test-year (*i.e.* current-year) value to avoid biased outcomes.[11] Thus, it seems reasonable to consider test year dollar valuation in transmission as a reasonable approach.

Critics might object that even test-year dollar valuation may not capture the full impact of age. Two identical transmission lines, one built in 2015 and another built in 2005 might have the same 2015-dollar value, but the ten-year-old line would likely be associated with higher O&M costs. Attaining this degree of accuracy in an index would require knowledge of the relationship of O&M cost to vintage, which would be very challenging.

[9] See V-NLH-083, rev. 1, for a description of the method.

[10] NLH, *2013 General Rate Application, Closing Submissions*, Dec. 23, 2015, p. 76.

[11] The bias can arise if old assets purchased at low prices are combined with newer assets purchased at prices that have risen due to inflation.

An alternative might be to track actual expenses associated with each customer's dedicated transmission assets and bill the customer directly, while in addition charging them for their share of remaining transmission-related expenses on the basis of the standard transmission allocator. Under this system, a customer who is directly assigned high asset costs for new or upgraded transmission assets would also have the lower expenses associated with new equipment. Directly assigned O&M costs under this system would be removed from the COS, although customers would continue to be allocated their share of common transmission-related O&M costs. The outcome of this approach is fairly allocated cost for the share of the transmission system common to all customers plus charges for actual repair costs. Since this system is applied, at least by a few small U.S. utilities, it has a regulatory precedent. In Canada, BC Hydro uses actual cost assignment to a limited degree, but only for costs that exceed its definition of normal expenditures.

Hydro has reviewed this approach. Unfortunately, the review concluded that it is not currently feasible, since current and past accounting processes do not supply sufficient detail to identify each individual O&M expense with a specific customer. Without this information, Hydro cannot develop forecasts for each customer of the amount of O&M to be deducted from transmission O&M costs in its COS study. This raises the possibility of double-counting of expenses, or at least some degree of error between actual and forecasted cost. Thus, the utility would need to change its accounting processes and accumulate customer-specific information for some time to implement this otherwise attractive approach.

Treating these O&M costs as common offers a fallback approach found acceptable in some jurisdictions. This approach would shield individual customers against large, unexpected repair costs by "socializing" the costs across the utility. However, this approach, while administratively practicable, is not preferred due to its failure to recognize differences in asset vintage among customers, and between direct assignment customers and other customer groups.

Direct assignment also affects the treatment of administrative and general expenses at Hydro in that the allocation of the various categories of A&G expenses is typically prorated based on shares of underlying assets. Specifically assigned transmission-related A&G thus depends on gross transmission plant assets. Hydro proposed in their 2013 GRA submission to modify A&G allocation to match proportionally the modification in direct assignment of O&M expenses. This methodology is applied to all categories of A&G expenses, with a proposed saving to direct assignment customers outside the direct impact of the change in O&M methodology. This appears to be a consistent extension of that methodology.

If Hydro were to charge for actual O&M expenses, there is a question as to the treatment of A&G expenses. The customers with specifically assigned assets would still be allocated a share of A&G costs based on the allocation of common transmission costs. The issue would then be whether additional charges should be due based on actual O&M expenses which are separately billed. If 5% of all transmission O&M costs were related to specifically assigned facilities, for example, one would expect the charge to reflect not merely direct labor and materials costs but additional elements to cover A&G. Hydro would then use

company accounting data to develop such a rate so that the share of A&G in total transmission maintenance cost would carry over into charges for specifically assigned asset maintenance costs.

**Recommendations.** We recommend that Hydro continue to directly assign O&M costs to specifically assigned assets in determining specifically assign charges for Industrial customers.

The current method of allocation of O&M expenses is correctly viewed by customers and Hydro as problematic, since direct assignment on the basis of original cost appears to be poorly correlated with actual expense patterns over time. There appears to be a feasible improvement, based on determination of test-year transmission asset value via Handy-Whitman indexes.[12]

We recommend that Hydro determine test-year transmission asset values via Handy-Whitman indexes (the current-year approach) to alleviate the current problem of inadvertently allocating higher O&M costs to newer assets and lower O&M costs to older assets.

We also recommend that Hydro's previous proposal that A&G expenses be directly assigned in the same proportion as O&M expenses be approved in conjunction with the above recommendations.

[12] Hydro understands that both the IC Group and Vale support this move to the current dollar approach. Reference letter of March 24, 2017 to Ms. Tracey Pennel of Hydro from Mr. Dean Porter of Poole Althouse.

## 4. ISSUE #2. CBPP FREQUENCY CONVERTER COST ASSIGNMENT

**Issue.** CBPP's paper mill load is served partly through a frequency converter through the conversion of some of its 50 Hz generation to 60 Hz. The customer faces a number of cost allocation and pricing issues arising from the presence of the converter. As a specifically assigned asset, capital expenditure on the frequency converter induces increases in O&M and other costs allocated to the customer through a specifically assigned charge which is updated each GRA. Underlying the issue of the cost allocation mechanism for specifically assigned charges is a question raised by the customer as to whether the unit should in fact be treated as common rather than directly assigned.

**Background.** The CBPP Mill is the last remaining facility on the Island with load served at the 50 Hz frequency. The customer owns and operates hydro plants with a combined installed capacity of approximately 135 MW. The hydro plants generate electricity at both 50 and 60 Hz and the mill site uses energy at both frequencies. Some of the 50 Hz generation produced at the customer's hydro facilities is converted to 60 Hz[13] at the Hydro frequency converter to serve its mill load.

Originally, the frequency converter provided services not just to the host customer but to the system as a whole. However, the expansion of the Island interconnected System reduced its contribution to the provision of voltage control for the local mill system, and for

[13] Approximately 18 MW.

conversion of 50 Hz power to 60 Hz for use on site. This change in function over time was the basis for the conversion to specific assignment of the assets in 2001.[14]

The frequency converter is relatively old, having been placed in service in 1967. It is owned and maintained by Hydro. Hydro has undertaken significant investment since Hydro's 2007 GRA. Direct assignment of these costs to CBPP has significantly increased their specifically assigned charge, which was approved as approximately $871,000 in the 2015 Test Year. The approved 2015 Test Year specifically assigned charge was an increase of $524,000 relative to the approved 2007 Test Year specifically assigned charge of $347,000.

Hydro maintained, in the 2013 GRA, that the "Corner Brook Frequency Converter remains of primary benefit to Corner Brook Pulp and Paper Limited."[15] Capital expenditures at the frequency converter are subject to the standard Public Utility Board Capital Budget Application process, and customers (including CBPP) are given an opportunity to review and question the Capital Budget Application on a project-by-project basis.[16] Thus, there appear to be questions of interpretation about the role of the frequency converter and associated cost responsibility that interact with the overall issue of specifically assigned charges.

**Discussion/Analysis.** Regarding the issue of how to treat the frequency converter, there are a variety of views in discussion in the 2013 GRA. Some supported the current arrangement. Mr. Patrick Bowman, representing industrial customers, argued for adjusted treatment of

[14] See 2001 General Rate Application, IC-NLH-32 Revised.

[15] See IC-NLH-186.

[16] See IC-NLH-100 Rev 1.

the CBPP frequency converter unit on four grounds.[17] First, he believed that the technical limit of 18 MW ought to result in a reduction in the value of the rate base that should be allocated to the customer. Second, he joined others in arguing about improper O&M cost allocation due to the vintage issue.[18] He indicated that all increases in O&M responsibility since 2007 should be eliminated. Third, he questions the core issue of whether the unit delivers benefits to the Hydro system, claiming that the frequency converter unit permits improvements in system stability and the occasional delivery of energy during emergency situations. Mr. Bowman indicated that if benefits are conferred upon the system, then some costs should be allocated in common. Fourth, he stated that the technical constraint on the frequency converter unit forces peak consumption of CBPP (and thus industrial customers as a class) upward by about 4.5 MW. More generally, Mr. Bowman objected to the imposition of expenses to maintain the frequency converter, arguing that these have not improved its operation as was expected.

For the longer term, Mr. Bowman wanted to explore changes in ownership of the unit, presumably to alleviate its cost burden. By reducing the asset share of the customer and revising the O&M allocation methodology, Mr. Bowman believes that CBPP and industrial customer cost assignment should be significantly reduced.

[17] See Bowman and Najmidinov, op. cit., p. 59*ff*.

[18] In fact, in oral testimony, Mr. Bowman suggests that the direct assignment of O&M charges to specific customers might occur very rarely in the industry, and that a cursory investigation failed to turn up an example. Transcript of Hydro GRA, Sept. 5, 2015, p. 145.

The unique 50 Hz situation and the ongoing requirement to convert 50 Hz generation to 60 Hz to supply mill load, suggests that the unit's purpose is predominantly, if not exclusively, to serve CBPP. This suggests that the unit fulfills the basic criterion of direct assignment: facilities that provide service exclusively to a particular customer (or customers).[19] This view is in line with that formed by the Board in its final ruling in the 2001 GRA, which supported the conversion to direct assignment. CBPP is compensated for its services in providing emergency capacity support to the grid under the Capacity Assistance Arrangements.

Regarding cost control, one can understand CBPP's concern for cost effective repairs to an aging unit. From Hydro's perspective, ownership imposes the obligation to maintain the unit, and decisions on the scale and cost of the expenditures reside first with the utility. Modifications in the method by which O&M costs are allocated to specific assignment customers may offer some degree of relief to CBPP. However, $543 thousand of annual costs associated with depreciation and return are unavoidable without further action.[20]

Two other issues raised by Mr. Bowman, and mentioned above, pertain to the technical limit of 18 MW on the operation of the frequency converter. CBPP views the limit as having been imposed upon it by Hydro. However, a study by General Electric for Bowater

[19] Reference NARUC's *Electric Utility Cost Allocation Manual*, p. 74. "For cost of service purposes, these [radial] facilities may be directly assigned to specific customers on the theory that these facilities are not used or useful in providing service to customers not directly connected to them."

[20] Newfoundland and Labrador Hydro, *2013 General Rate Application, Order No. P.U. 14(2017) Compliance Application*, Schedule 3.3A, p. 40 of 109.

Newfoundland, Ltd. (CBPP's predecessor) recommended the 18 MW limit.[21] This review offers no opinion on this technical topic. It has COS implications through the 4.5 MW impact on peak demand. Since the customer is the source of this limit, it appears that the customer would need to make a technical argument for its adjustment.

**Recommendations.** We recommend that the frequency converter unit continue to be assigned directly to CBPP, due to its apparent use almost solely by the customer and the availability of compensation for service that is provided from time to time. We cannot pass an opinion on the technical issues surrounding benefit limitations pertaining to the 18 MW technical limit on capacity or on the question of cost effectiveness of repairs.

## 5. ISSUE #3. CBPP PILOT PROJECT

**Issues.** A pilot project initiated in 2009 assists CBPP by providing relief from the need to use its hydro facilities to follow plant load for the purpose of minimizing peak demand at the site. This pilot project has been periodically reviewed for its ability to deliver benefits to the system via delivery of energy to reduce fuel costs at Holyrood. At issue is whether the pilot project should be extended or terminated, with perhaps an alternative contractual arrangement being put in its place. This review is timely because the benefits to all customers arising from the fuel cost savings that were the basis of the original contract are not expected to continue upon completion of the MF project.

[21] See IC-NLH 194, Rev. 1.

**Background.** Since 2009, CBPP has been operating under a piloted Generation Credit service contract that permits CBPP to optimize the efficiency of its 60 Hz Deer Lake Power generation. The agreement allows Hydro to call on CBPP to maximize its 60 Hz generation (including the frequency converter) prior to increasing generation at Holyrood for system reasons and prior to starting its standby units (*i.e.*, a "capacity request"). However, capacity is only made available to the grid in this manner if mill loads are reduced and CBPP is able to generate in excess of what it requires for its own use. Otherwise, if the mill is using its maximum power requirements, no excess generation is made available to the grid under this provision[22]. Savings are provided to CBPP for providing this additional capacity to the system by permitting CBPP to exceed its firm power requirements and to avoid costs associated with thermal or standby energy rates.[23,24]

Prior to the winter of 2014/2015, Hydro entered into Capacity Assistance and Supplementary Capacity Assistance agreements with CBPP[25]. Under these arrangements and on rare occasions the facility provides emergency capacity to the grid.[26] This is achieved through load interruption of up to 90 MW at the Corner Brook mill when system generation

[S] See RFI IC-NLH-186.

[23] Reference NLH 2015 Amended Exhibit 4, Section 3.3.1 pg.'s 12-13 and Table 8 pg. 21.

[24] See IC-NLH-059 Rev 1.

[25] See IC-NLH-186.

[26] Bowman and Najmidinov, Updated Pre-Filed Testimony, NLH 2013 Amended General Rate Application, June 4, 2015, p. 58.

reserves are low[27]. Hydro compensates CBPP for services under these arrangements through fixed winter credits and usage payments.[28]

**Discussion/Analysis.** The pilot project and capacity assistance provisions have allowed CBPP to separate the electricity consumption decision from the generation decision, at least in part. However, it now appears that there will be reduced benefits to Hydro from the provision of emergency capacity assistance, relative to past system conditions.[29] If the current pricing system could be replaced with short-notice pricing that reflects Hydro system conditions, then perhaps CBPP would be able to optimize its generation and consumption to yield more benefits than are possible under the current arrangement.

From the perspective of Hydro's costs, the utility must recover from CBPP its generation, common transmission, and specifically assigned transmission costs (along with any other

[27] Net to the system is approximately 80 MW as this level of load interruption at the mill would effectively shut down production from the CBPP cogeneration unit. There are two contractual arrangements for providing capacity: one for Capacity Assistance (up to 60 MW) and another for Supplemental Capacity Assistance (up to an additional 30 MW). There are fixed fees for the Capacity Assistance arrangements only.

[28] While the current application focuses on the Test Year only, in this case, it may be worth considering future years to avoid taking a position on the issue that might need to be changed in the near future. After the commissioning of the Muskrat Falls Project, Hydro may find that the opportunities for the frequency converter to be used for system support such as capacity assistance may be reduced, since the Hydro system will be long in generation with the arrival of Muskrat Falls power. Should an outage occur on the LIL, Hydro feels that under certain circumstances such as temporary unavailability of sufficient 10-minute reserves, the capacity assistance may be a consideration. The amount of extra capacity required would be uncertain. If the Capacity Assistance Arrangements were in place, it would provide a platform for payment to CBPP. Considering that there are only transmission constraint issues, CBPP's value of services provided may drop from its current level, which may be reflected in any future contract payments.

In the interim, before Muskrat Falls completion but upon completion of the LIL, power from Labrador, specifically recall energy from Churchill Falls, may be available, reducing the value of power supplied by CBPP under the Capacity Assistance and Supplementary Capacity Assistance agreements.

[29] However, the Deer Lake hydraulic capacity likely would be optimized if it were run in harmony with the net supply situation in Hydro's Island grid.

costs that the COS process might allocate to Industrial class customers). An alternative approach to the current Industrial rate combined with the pilot project contractual arrangement would be a "two-part pricing" contract. Such contracts are found in deregulated and regulated markets. The utility and customer agree upon a contractual amount of usage and peak demand that serves as the basis for pricing under a standard tariff. The contract quantity (the "customer baseline load" or CBL) is fixed, and the resulting "base bill" is thus a lump sum dollar amount that changes only with changes in the underlying rate.[30] The contract amounts represent the customer's "normal" level of usage and can vary with the time of the year or time of day. Usage levels that depart from the CBL are priced according to hourly, day-ahead prices that reflect marginal energy and marginal reserves costs.[31] This dynamic pricing arrangement, known as real-time pricing (RTP) is a well-established retail pricing product.

For Hydro and CBPP, use of RTP would require agreement on a pattern of hourly (net) consumption of Hydro energy and monthly peak demands that would serve as the basis for embedded cost responsibility under the Industrial rate. CBPP could have a CBL based on its current Power on Order, multiplied by historical load factor (but backing out capacity assistance and interruptible load relief from the load profile). When priced at embedded cost, the base bill will cover revenue requirements. (The CBL would continue to treat peak

[30] Under regulation, such changes include changes in the fuel cost recovery rate.

[31] These marginal costs are simply the cost of providing an extra kWh of generation services and reflect whatever resources are available. Naturally the pattern and level of marginal costs will change as Hydro interconnects with the North American grid and then adds the Muskrat Falls unit to the set of available resources.

demand in the same manner as the pilot agreement by billing on contract rather than actual demand, and eliminating the need for CBPP to use generation to follow load.)

An additional requirement would be the ability of Hydro to generate day-ahead hourly RTP retail prices (which are just marginal cost and a small mark-up in other jurisdictions). CBPP would then receive daily price vectors that it could use to plan its operations of its mill and hydro facility.

This suggestion is preliminary in that it would require review of any technical limitations on Hydro's ability to deliver power independent of and additional to system conditions indicated by the RTP price. (As an illustration, if marginal cost is low, the cost of incremental load above the CBL might be just $0.03/kWh; while at times of system constraint, the price might be $1.00/kWh, reflecting the high marginal cost of reserves.)

This pricing approach offers Hydro and CBPP several advantages. First, the base bill is stable and predictable, and set to collect required revenue at rates approved by the PUB. Second, RTP pricing allows Hydro to communicate system conditions to CBPP at short notice and permits CBPP to minimize its energy costs and optimize its hydro facility usage. Third, the contract is relatively simple, permitting elimination of various contractual forms of energy currently in use that each has its own terms, constraints, and pricing.[32] Fourth, it may help to avoid debate as to the value to Hydro of the CBPP generation, since CBPP would be paid market value for that generation. When RTP price is high, CBPP may decide to reduce mill

[32]This structure could include the sale of secondary energy, hitherto to Newfoundland Power, but perhaps transferred to NLH, with marginal cost-based settlement provisions with Newfoundland Power, if needed.

production and increase hydro generation, providing power to the grid for which Hydro will pay market price.[33]

Additionally, there is no reason why this structure cannot be applied to other Industrial customers. The embedded costs allocated by the COS study will yield unit costs that will support pricing of the CBL, while marginal cost will support pricing of incremental load.

**Recommendations.** We recommend that Hydro not offer to renew the pilot project in the 2017 GRA given the anticipated reduction in the value of energy services that CBPP is likely to be able to provide to the system following completion of the LIL and, subsequently, Muskrat Falls. We also recommend that Hydro broach with CBPP the idea of two-part pricing, specifically real-time pricing, as a replacement for its current pilot project and associated Capacity Assistance agreements.

## 6. ISSUE #4. ALLOCATION OF THE RURAL DEFICIT

**Issue.** Hydro charges its rural customers at rates that either equal to or partially reflective of the rates charged by Newfoundland Power, rates which fail to cover Hydro's cost of service in its rural areas, costs which tend to be particularly high in isolated locations. Hydro makes up the deficit with supplementary volumetric charges on Newfoundland Power and Rural Labrador Interconnected System (RLIS) customers. The methodology of deficit allocation

[33] This approach appears to fit well with the environment that will follow completion of the Muskrat Falls project. Increases in embedded costs will be incorporated in the base bill that applies to normal levels of consumption. Potentially low marginal costs when power is abundant will permit CBPP to contemplate increased mill production (or reduced hydraulic flow) and will facilitate power delivery by CBPP when system resources are limited.

was reviewed in the 2013 GRA and the Board approved the use of the revenue requirement method as proposed by Hydro. Page 102 of Order No. 49 (2016) states: "the Board expects that Hydro will address the rural deficit allocation methodology in its cost of service report and all parties will have a further opportunity to have input as part of the review of that report." This testimony reports on the review undertaken in the cost of service methodology review report.

**Background.** Subsidizing rural customers has been a feature of service in the Province since the early 1990s, and the practice of subsidizing small numbers of customers in remote locations is common in other provinces of Canada. The customers benefiting from the subsidy are found in four groups: Island rural interconnected (about 23,700 customers) Island isolated (about 800) Labrador isolated (about 2,700) and L'Anse au Loup (about 1,000) totaling about 28,300 customers.[34]

The cost burden of the rural deficit is allocated to Newfoundland Power and to Labrador Interconnected customers, Island industrial customers having been exempted from responsibility in 1999.[35] The Electric Power Control Act mandates that these two customer groups fund the subsidy, but does not prescribe how it is to be allocated.[36] Until the 2013 GRA Order, the allocation was based on an "equal unit cost" allocation mechanism

[34] As recorded in NLH's COS model, 2015.

[35] Order-in-Council 2003-347 also specifies that NP customers and Labrador rural interconnected customers are to fund the rural deficit. See NLH, *2013 General Rate Application, Final Submission*, revision 1, p. 14. The 1999 date regarding the Island industrial customers is referenced on p. 15.

[36] See Dr. J. Feehan, *Report on the Allocation of the Rural Deficit*, prepared for Miller& Hearn, representing the towns of Labrador City, Wabush, Happy Valley-Goose Bay, and North West River, p. 1, footnote 1.

developed in 1993 by the Board's witness, Mr. George C. Baker.[37] Under this mechanism, Hydro classified the deficit total among demand, energy and customer categories based on the total costs in each classification for the NP and Labrador Interconnected rural customers combined. The classified amounts of the deficit were then applied to the combined groups' unit costs for each classification to determine the deficit share for each of the two groups of customers. Essentially, this approach has been viewed as allocating the deficit using a mini-COS study.

The difficulty with this "equal unit cost" approach is that it allocates materially higher amount per customer from Labrador Interconnected customers (who are significantly higher users of energy than Island customers, chiefly due to relatively colder weather and consequent heavy use of electric heating) than the amount per customer to be recovered from customers of Newfoundland Power. This approach produced much higher revenue/cost (R/C) ratios for RLIS customers than for NP—1.42 vs. 1.12—as revealed by Hydro's 2103 Amended GRA evidence.[38]

Hydro analyzed the impact of this approach in response to customer concerns about the impact of the resulting charge, and concluded that it was reasonable to modify the approach. After considering options, the utility selected a revenue requirements-based allocation whose purpose is to equalize R/C ratios, and whose effect is to increase the

[37] Board of Commissioners of Public Utilities, *Report on … the Proposed Cost of Service Methodology…* February 1993, Appendix 1.

[38] NLH, *2013 Amended General Rate Application*, Section 4.3.1, reference Table 4.2 for the R/C ratios.

allocation of the deficit burden in the direction of NP customers and reduce the deficit burden for the Labrador Interconnected customers.

**Discussion/Analysis.** At the 2013 GRA, there was general agreement that there is no solid basis for allocating the rural deficit. Since the deficit has no association with any of the costs of the subsidizing customers, there is no clear cost allocation method available to recommend from a perspective of costing theory. Additionally, industry practice does not have much to offer, since smaller subsidies are less noticeable and do not create debate as a result.

In the absence of cost-related guidance, Hydro gravitated to a notion of fairness based on results, a departure from standard costing practice, and hampered by the difficulty in defining what constitutes fairness. That search for improved fairness caused the utility to explore two alternatives to the established method of allocating the rural deficit. They assessed an equal R/C ratio approach based on revenue requirements, as well as an approach that relies on number of customers. Arguably, achieving equal R/C ratios after imposition of the rural deficit charge is a desirable criterion for allocation. However, a case can be made for equal customer bill impact as well.

These methods lead to annual average costs per customer numbers that are very similar between the two groups of subsidizing customers, NP and Labrador Interconnected.[39] In contrast, the previously approved method, based on equalized unit costs, imposes an

[39] NLH, *2013 Amended General Rate Application*, Section 4.3.1, p. 4.10. See Table 4.3 for results.

annual bill increase of $653 on RLIS customers and just $217 on NP customers, due to differences in consumption levels. Even with impact equalization by means of the alternative approaches, subsidizing customers would have $207-$235 added to their annual bills.

The 2013 GRA process resulted in commentary on Hydro's analysis and proposed change. Most intervenors, and the Board's consultant, Mr. John Wilson, supported a change. The exception, Mr. Larry Brockman, representing NP, felt that the change was unwarranted and that the mini-COS methodology was sound.[40] Another intervenor, Dr. James Feehan, participating on behalf of several Labrador towns, suggested four alternative approaches to allocating the rural deficit, including one similar to Hydro's customer-based alternative.[41]

In the absence of a cost-causative criterion for allocation of the rural deficit, or of a single best indicator of fairness, the choice of an allocator may be influenced by criteria such as simplicity and by acceptability of outcome to stakeholders. These criteria place the equal unit cost method at a disadvantage on both counts.

Hydro's revenue requirements method has the virtue of simplicity of computation and comprehensibility of outcome, relative to its predecessor, the equal unit cost method. The revenue requirements method also avoids the apparent problem of significant differences in R/C ratios that arises with the equal unit cost method, and the consequent price

[40] These views are summarized in NLH's *2013 General Rate Application, Final Submission*, revision 1, p. 71*ff*.

[41] Dr. J. Feehan, *op. cit.*, pp. 7-10.

distortions away from unit cost that arise with R/C ratios of 1.42 for rural Labrador interconnected customers and 1.12 for NP customers.

Additionally, the revenue requirements approach may have an advantage over the customer approach. The customer approach is initially appealing: equal charges to all customers. However, customers vary significantly in size and average bill between NP and rural Labrador interconnected groups, and the approach burdens residential customers more than larger general service customers, thereby imposing a small distortion in R/C ratios. A rate designer striving for parity would automatically move rates against the allocation and in the direction of the equal R/C ratios of the revenue requirements method. In that case, it may make sense not to affect R/C ratios in the first place, and undertake the slightly more complicated revenue requirements computation.

**Recommendations.** We recommend that Hydro continue to utilize the rural deficit allocation method based on revenue requirements. The criterion of equalizing revenue-to-cost ratios across regions and the concomitant avoidance of price distortion appear to be desirable features of this approach. The relative simplicity of the calculation method, when compared with the existing approach, is an additional advantage.

## 7. ISSUE #5. CLASSIFICATION OF PURCHASES OF WIND GENERATION

**Issue.** Hydro requested CA Energy Consulting to review its classification of the wind generation that it purchases. The utility is aware that there are diverse views on this

classification issue and would like to arrive at a position that fits its own wind purchase circumstances.

**Background.** Hydro proposed in its Amended 2013 GRA that wind purchases be classified as 100% energy-related, a change from a load factor-based classification scheme supported previously. (The previous approach classified as energy-related the share of generation costs equal to system load factor and the remainder as demand-related.) The basis for this change is that Hydro's system planners "no longer assume wind generation will be available to meet system capacity requirements." [42] Hydro currently uses its wind purchases as substitutes for generation by its Holyrood units, and measures the benefits of wind in terms of fuel savings.[43] Hence their conclusion that wind purchases should be 100% energy-related.

**Discussion/Analysis.** In evaluating Hydro's proposal, it is worthwhile to review Hydro's argument and available evidence regarding industry practice. The system planning argument relies on the concept that planners' views are logically prior to observed wind generation patterns, either at Hydro or in other jurisdictions. That is, the first question in classifying wind should be to ascertain planners' views as to the role of wind generation in meeting capacity needs. *If* planners see a capacity role for wind, then it makes sense to examine evidence of the role of wind in meeting capacity needs. Even with respect to conventional dispatchable generation, cost classification strives to reflect the views of

[42] Newfoundland and Labrador Hydro, *Amended 2013 General Rate Application*, p. 1.5R

[43] *Ibid*, p. 1.13

system planners. This perspective does not lead to a single classification methodology but instead allows the utility wide discretion in its approach. In the case of wind generation, it is plausible that Hydro's system planners would find no capacity value in a non-dispatchable wind power purchase while planners at other utilities would find some degree of capacity value.

In fact, many utilities do accord capacity value to wind. During the review of Hydro's 2013 GRA, Vale witness Mr. Melvin Dean referenced previous Hydro research indicating that North American industry practice is varied, sometimes resulting in the classification of wind as energy-only, while at other times granting wind generation a capacity role. Referencing NP-NLH-280, he finds that a high proportion of utilities split wind costs between demand and energy. Many use a percentage of nameplate wind generator capacity as a basis for determining shares.

Witness Dean then presents, for six utilities that report classification shares between energy and demand, information on the relationship between capacity factor and demand share. Two utilities (BC Hydro and Austin Energy) classify wind generation as 100% energy-related, while four other utilities accept a demand component. Three of these classify wind as between 9 and 20% demand-related. A fourth utility, MidAmerican Energy of Ohio, has a demand component of (1 – load factor) of the sort formerly used by Hydro, resulting in a value likely higher than any of the other three.[44]

[44] Melvin Dean, *Expert's Report on Newfoundland and Labrador Hydro's Amended 2013 General Rate Application*, June 4, 2015, page 14.

Additionally, witness Dean reports that Hydro's historical experience, as reported in NP-NLH-390, reveals wind generation levels between 48 and 64% of wind capacity during system peak periods. On this basis, and because Hydro's wind generator capacity factors appear to be above average for the industry, he suggests that a stronger than average demand component should be adopted by Hydro. He observes that the St. John's area has higher average wind speeds than Saskatchewan and that SaskPower accords a 20% demand share to wind generation. He suggests that this should be a floor for Hydro, with a proper choice of share needing to be dependent on a future study for this purpose.[45]

Witness Dean also notes that Austin Energy treats wind generation as base load and, under their base-intermediate-peak methodology, determines that wind generation should be 100% energy-related. (He also suggests that the use of this methodology should discount the value of the zero-demand share for purposes of review of Hydro's proposal since Hydro's generation cost classification methodology is different.) In between the SaskPower and Austin Energy estimates, Nova Scotia calculates a demand share of 9%.

The Nova Scotia case raises an additional consideration as to whether the classification of wind generation should be tied to, or at least influenced by, a utility's classification of its other generation costs. Since wind generation is not dispatchable, it is doubtful that wind needs to be accorded similar treatment. A utility might wish to adopt a similar methodology but the case for similarity of classification does not appear to be strong.

[45] *Ibid*, pp. 14-15.

A Canadian utility not considered directly by witness Dean is Prince Edward Island's Maritime Electric, which sources approximately one-quarter of its energy from wind, measured on the basis of cost.[46] The utility purchases wind on a take-or-pay basis and wind is ranked just behind power purchases from Point Lepreau in New Brunswick in its generation order. Based on this methodology, Maritime Electric classifies its wind purchases as 100% energy-related.[47] This example is fairly similar to that of Hydro's practice of treating wind purchases as substitutes for the fuel costs of generation by the Holyrood units. Arguably, these similarities support Hydro's view of its wind purchases as being driven by energy only.

The above analysis takes place in the context of conditions in which system planners have accorded a role *a priori* to wind power in capacity planning. Once this assumption is made, then calculations of a wind component lead reasonably to the results reported in Mr. Dean's testimony. The issue, then, is whether the presence of a demand share at other utilities, whose planners view wind as having a capacity component in system planning, should have weight in contradicting a utility's system planners who believe, as Hydro's do, that wind should be accorded no weight in capacity planning.

Unfortunately, calculations by other utilities are based on their planners' views and practices. If a utility's planners see no capacity value in wind, as Hydro's evidence suggests that they do, then others' calculations are not necessarily of value. Logically, Hydro's

[46] *Application and Evidence of Maritime Electric Company*, Oct. 21, 2015, Schedule 8-3, p. 32

[47] *Ibid*, p. 92, sec. 13, Cost Allocation Study.

planners' views are prior to discussions of any calculations of capacity factor and, ultimately, classification share. From this perspective, Hydro is entitled to claim that its planners' views are paramount. By extension, the utility need not perform a study of capacity factors and performance of wind generation in peak hours or hours of low reserves since the results are not bound to influence the planners' conclusions.

**Recommendation.** We recommend that Hydro's planning perspective for classification of purchases of wind generation be accepted by the Board. An energy-only classification approach is plausible and defensible, based on Hydro's planning perspective regarding wind generation. If Hydro's planners had concluded that wind had a capacity role for planning purposes, then classification methods and results in other jurisdictions would have had weight in considering classification shares.

## APPENDIX 1: SUMMARY OF RECOMMENDATIONS

Issue #1. O&M Costs Related to Dedicated Transmission Assets

- We recommend that Hydro continue to directly assign O&M costs to specifically assigned assets in determining specifically assign charges for Industrial customers.
- To determine the allocation of O&M to specifically assigned assets, we recommend that Hydro determine test-year transmission asset values via Handy-Whitman indexes (the current-year approach) to alleviate the current problem of inadvertently allocating higher O&M costs to newer assets and lower O&M costs to older assets.
- We also recommend that Hydro's previous proposal that A&G expenses be directly assigned in the same proportion as O&M expenses be approved in conjunction with the above recommendations.

Issue #2. CBPP Frequency Converter Cost Assignment

- We recommend that the frequency converter unit continue to be assigned directly to CBPP, due to its apparent use almost solely by the customer and the availability of compensation for service to the system that is provided from time to time.

Issue #3. CBPP Pilot Project

- We recommend that Hydro not offer to renew the pilot project in the 2017 GRA given the problematic anticipated reduction in the value of energy services that CBPP is likely to be able to provide to the system following completion of the LIL and, subsequently, Muskrat Falls.

- We also recommend that Hydro broach with CBPP the idea of two-part pricing, specifically real-time pricing, as a replacement for its current pilot project and associated Capacity Assistance agreements.

Issue #4. Rural Deficit

- We recommend that Hydro continue to utilize the rural deficit allocation method based on revenue requirements. The criterion of equalizing revenue-to-cost ratios across regions and the concomitant avoidance of price distortion appear to be desirable features of this approach. The relative simplicity of the calculation method, when compared with the existing approach, is an additional advantage.

Issue #5. Classification of Wind Generation

- We recommend that Hydro's planning perspective for classification of purchases of wind generation be accepted by the Board. An energy-only classification approach is plausible and defensible, based on Hydro's planning perspective regarding wind generation. If Hydro's planners had concluded that wind had a capacity role for planning purposes, then classification methods and results in other jurisdictions would have had weight in considering classification shares.

**EXHIBIT BRC 1. RESUME OF BRUCE R. CHAPMAN**

# Bruce R. Chapman

RESUME

January 2017

**Address:**

800 University Bay Drive, Suite 400
Madison, WI 53705–2299
Telephone: 608.216.7147
Fax: 608.231.2108
Email: brchapman@caenergy.com

**Academic Background:**

All course work necessary for PhD, University of Wisconsin–Madison, 1981, Economics
MA, University of Wisconsin–Madison, 1979, Economics
BA, University of Pittsburgh, 1976, Economics

**Positions Held:**

Vice President, Christensen Associates Energy Consulting, LLC, 2015-present
Senior Economist, Christensen Associates Energy Consulting, LLC, 2005–2014
Senior Economist, Laurits R. Christensen Associates, Inc., 1992–2005
Economic Analysis Consultant, Laurits R. Christensen Associates, Inc., 1988–1992
Research Economist, Laurits R. Christensen Associates, Inc., 1986–1988
Associate Consultant, Coopers & Lybrand Consulting Group, Economics Practice, Toronto, Canada, 1985–1986
Research Assistant, University of Wisconsin-Madison, 1980–1981
Research Analyst, Woods Gordon (Economics Group), Toronto, Canada, 1979–1980

**Professional Experience:**

I assist clients in the electricity and natural gas industries to improve their costing and pricing capabilities. I advise clients in such areas of expertise as: cost-of-service analysis and rate design based upon established regulatory and market-based principles; innovative rate design including demand response products, renewables pricing, fixed billing, and other market-based retail pricing products; load forecasting and load research analysis. I supervise and conduct analysis of costing and pricing issues for utilities, regulators, customers and other industry stakeholders. Additionally, I have supervised the development of software required for the implementation and support of innovative retail products. Examples include cost-of service and rate design models to

support rate applications, and models to predict customer tariff choice and price response. I regularly present costing and pricing issues and concepts at industry conferences and workshops.

**Major Projects:**

Reviewed economic development and load retention rates for a Canadian utility.

Evaluated behavior or fixed billing customers following instances of very high consumption.

Reviewed the retail rate portfolio of a Canadian utility with respect to industry standards.

Reviewed the cost causation underpinnings of a utility's residential rate design.

Collaborated in a review of standby rate structures for a Midwestern utility.

Provided pricing and revenue recovery guidance to a Caribbean utility.

Provided guidance to a Southeast Asian utility in the design of time-of-use rates. Guidance included instruction in simulation of price response.

Directed a cost-of-service study for a large distribution utility.

Assisted a utility to adjust its costing and pricing methods following addition of significant new generation and transmission assets.

Assisted a utility to merge rates of two separate service territories following a corporate merger.

Reviewed a natural gas distribution utility's proposal for a commodity hedging arrangement.

Assisted in developing an electric vehicle tariff for a Midwestern utility.

Assisted in an evaluation of economic development and load retention rates for a Midwestern utility.

Led an evaluation of a Midwest utility's residential time-of-use rate in comparison with other TOU designs and current marginal costs. Evaluated means by which participation could be increased.

Participated in an evaluation of the merits of a special contract for a large customer of an Eastern utility.

Conducted an analysis of the relative cost-of-service implications of creating a separate class for a specialized subset of customers from an existing large customer class.

Assisted a Great Plains utility to develop a renewable tariff for large industrial customers.

Managed a project that assisted a Great Plains public service commission staff to evaluate natural gas utility submissions for safety-related cost recovery via new riders.

Participated in a load research data development project for a Midwestern utility, including sample design and selection, and class interval load profile development.

Conducted an analysis of the cost implications for a Caribbean utility of introducing LED street lighting.

Developed generic cost-of-service and rate design models for use in client rate cases.

Customized company cost-of-service and rate design models for an Asian utility. The project also included support for marginal cost capability development.

Led a rate case preparation process for a Southeastern utility that included load and energy forecasting, development of revenue requirements, and support for cost of service and rate design.

Participated in a Midwest utility's rate case by reviewing current mass market time-of-use and other rate designs and recommending modifications.

Collaborated in a review of a large Canadian utility's cost-of-service methodology, including a public review process with stakeholders. Testified before regulator regarding recommendations.

Conducted an assessment of a Great Plains public power utility's plans for three pricing concepts: green power, economic development rates, and unbundled retail pricing to facilitate customer choice.

Assisted a distribution utility to review aspects of its distribution cost allocation methodologies by conducting a survey of methodologies across a number of electric utilities.

Assisted a state energy office to review ways in which the state could improve its record of energy efficiency program achievements, as recorded by the ACEEE Scorecard.

Collaborated in the development of rate redesign alternatives for a utility's real-time pricing program structure.

Collaborated in the review of the potential for a Canadian utility to introduce a fuel adjustment mechanism.

Conducted an analysis of probable migration of customers to new time-of-use electricity programs offered by a southeastern utility.

Evaluated the accuracy of an electric utility's fixed bill offer algorithm and recommended modifications.

Led a project which conducted a review of an electric utility's avoided cost calculation and the application of those costs in energy efficiency reviews.

Managed and participated in reviews of rate and gas cost adjustment applications for a Great Plains public service commission's gas division.

Conducted a cost-of-service and rate design study for a Caribbean utility in preparation for a rate submission.

Supported review for an industrial customer group of a large filing by a utility, focusing on non-bypassable riders.

Managed a gas cost review process for a Great Plains regulatory agency.

Analysis of smart grid pricing issues for a Great Plains public power utility.

Contributed to load research sample development for an investor-owned utility.

Managed a review of a large electric and gas utility's costing methodologies.

Managed a cost-of-service and rate design study for a Caribbean utility.

Conducted analysis of distribution costing practices at a large Midwestern investor-owned utility.

Development of a time-of-use rider for two electric utilities.

Management of a study of interruptible pricing program improvements for a large Midwestern utility.

Management of a comprehensive cost-of-service and rate design study for a Caribbean utility.

Strategic pricing for a large hydro-dominated utility.

Evaluation of the net economic benefits of alternative power supply strategies: coal vs. renewables and energy efficiency.

Load forecasting project for a medium-sized electric utility with significant industrial load.

Analysis of alternative means of net metering.

Evaluation of alternative demand response programs for a municipal utility.

Analysis of treatment of margins from real-time pricing.

Analysis of a natural gas energy conservation funding mechanism.

Design and pricing of a small customer Time-of-Use program.

Evaluation of cost of capital for a small Caribbean utility.

Risk pricing of a long-term customer choice retail contract.

Evaluation of response by small customers to fixed billing programs.

Evaluation of response by medium-sized customers to a banded fixed billing program.

Cost-of-service project including marginal cost and traditional cost basis.

Preparation of load research survey sample via stratified random sampling.

Design and pricing of a Critical Peak Pricing product

Evaluation of residential customers' propensity to adopt a voluntary Time-of-Use product

Pricing of a fixed bill product for a new service territory based on response elsewhere

Evaluation of peak period response to a fixed billing product

Development of an electric utility fuel forecast

Customization of fixed bill software for use at a utility site

Design and pricing of a Banded Fixed Billing product.

Long-term wholesale power procurement for an electric utility.

Report on Adoption of Variable Pricing contracts in deregulated retail electricity markets.

Development of Fixed Bill software to generate offers and monitor customer behavior.

Quantitative evaluation of net benefits of demand response programs.

Quantitative evaluations of customer response to fixed billing.

Design and pricing of several pilot and permanent fixed-bill programs.

Development of Efficient Tariff Prices via Marginal Costing.

Analysis of Market Data Available to Estimate Marginal Cost of Reliability.

Evaluation of Risk of Fixed Billing Based on Customer Response.

Cost Allocation Analysis for Rate Case Filing.

Analysis of Customer Response to Fixed Billing.

Fixed Bill Scoping for a Natural Gas Provider.

Analysis of Risk Implications of Fixed Billing for an Electric Utility.

Strategic Assessment of an Electric Utility's Retail Tariff Portfolio.

Guaranteed Bill Product Design and Risk Assessment.

White Paper on Interruptible/Curtailable Service.

Marginal Cost-Based Cost of Service Development.

Software Scoping for Self-Designed Products.

Flat Bill Offer Software Development.

Comprehensive Rate Repricing.

RTP Price Hedging Product Development.

Retail Pricing Under Competition Conference.

Rate Optimization Plan.

Fixed Bill Product Development.

Weather Hedge Evaluation.

Real-Time Pricing Product Development.

Workshop: Creating a Diversified Retail Pricing Portfolio.

Product Mix Business Plan.

Prepared material for testimony in Federal District Court on Real-Time Pricing.

Risk-Based Pricing Workshops.

Survey of New Electricity Market Players.

Analysis of Fixed Bill Products.

Strategic Pricing Plan for a Midwestern Utility.

Product Mix Analysis for Small Customers.

Real-Time Pricing Workshop.

Innovative Pricing and Marginal Costing for a Co-op.

Real-Time Pricing with Multiple Options.

Real-Time Pricing for a G&T and its Co-ops.

Product Mix Analysis for Large Customers.

Real-Time Pricing Service Design for Commercial Customers.

Advanced Service Design Workshop.

Real-Time Pricing Program for a Midwestern Utility.

Evaluation of Customer Response to Real-Time Pricing.

Real-Time Pricing Program Development for an Eastern Utility.

Two-Part Pricing Service Design.

Real-Time Pricing Regional Workshops.

Real-Time Billing Program Support and Revision.

Electricity Efficiency Programs.

Real-Time Pricing Program Redesign for an Eastern Utility.

Real-Time Pricing Implementation for a Canadian Utility.

Real-Time Pricing Practitioners' Workshop.

Real-Time Pricing for a Canadian Utility.

Customer Evaluation of Real-Time Pricing.

Review of Competitive Pricing Strategies.

Evaluation of Process of Marketing Real-Time Pricing.

Review of Methods for Distinguishing Customer Response to Rate Change.

Real-Time Pricing Rate for a Southern Utility.

Review of Accounting and Incentives for a Real-Time Pricing Rate.

Analysis of Load Impact of Priority Service Alternatives.

Benefit/Cost Analysis of an Integrated Energy Management System.

Benefit/Cost Analysis of Marginal Cost-Based Rates for DSM Integrated Resource Plan.

Impact Evaluation of Curtailable Electric Service.

Survey of Households Who Were Candidates for Voluntary Time of Use Rates.

Audit of Energy Management Software.

Real-Time Pricing Rate for a Large Northeastern Public Utility.

Software Design for Real-Time Pricing.

Improved Approaches to Estimating Benefits of DSM Programs.

Load Shapes Assessment Program.

Fuel Purchase Contract Study.

Evaluation of the Effects of Canadian Energy Policy.

Evaluation of Energy Conservation Programs.

**Professional Papers:**

"Pricing Distributed Generation: Challenges and Alternatives," *Natural Gas & Electricity*, March 2017.

"Pricing of Renewable Energy Made Difficult by Policy Challenges," *Natural Gas & Electricity*, January 2016.

"Room for Fixed Billing in the World of Conservation?," *Natural Gas & Electricity*, August 2008.

"Hedging Exposure to Volatile Retail Electricity Prices," *The Electricity Journal*, June 2001 (with Ahmad Faruqui, Dan Hansen, and Chris Holmes).

"A Survey of Real-Time Pricing Programs," *The Electricity Journal*, August–September 1993 (with Juliet Mak).

"Real-Time Pricing: DSM at Its Best?," *The Electricity Journal*, August 1990 (with Tom Tramutola).

**Conference Presentations:**

"Net Metering and Solar Energy Pricing," pre-conference workshop at EUCI's Net Energy Metering and Utility Solar Rates Summit, July 2016.

"Pricing the Purchase of Renewable Energy," post-conference workshop at EUCI's 4th Annual Southeast Clean Power Summit, March 2015.

"Pricing Perspectives of Regulated Utilities on Solar Power," EUCI's Net Metering 2.0 and Utility Solar Rates Conference, Anaheim, CA, January 2015.

Cost of Service and Rate Design; Current Utility Costing and Pricing Challenges; Pricing Renewable Energy; Feed-in Tariffs and Demand Response Alternatives to Supply. Presentations to the Wisconsin Public Utility Institute's Energy Utility Basics Course, 2009–2016.

"The Bill Please," university course and public presentation within the "Decoding the Energy Industry" series; Wisconsin Public Utility Institute, 2014.

Electric Rate Design Principles and Designs (with Dr. Stephen Braithwait), and Pricing Renewable Resources; presentations to the Rate Design and Regulation Workshop, Wisconsin Public Utility Institute, Madison, Wisconsin, 2014.

"Customer Response to Dynamic Pricing: Who Responds and How?," EUCI's Smart Ratemaking Conference, Oct. 2009, Los Angeles; with Dr. Steven Braithwait.

Cost-of-Service, preconference workshop, EUCI's Smart Ratemaking Conference, Oct. 2009, Los Angeles.

Critical Peak Pricing: Valuation and Viability, presented at AESP's Innovations in Retail Pricing Conference, Chicago, IL, May 17, 2006.

Georgia Power's FlatBill Program, Risks and Returns, presented, with Monamee Adhikari, Georgia Power Company, at AESP's Innovations in Retail Pricing Conference, Chicago, IL, May 17, 2006.

Retail Pricing for Competitive Power Markets, six presentations on retail pricing and unbundling; Infocast conference February 28-March 2, 2001.

Retail Products and Pricing Under Competition, presented at the Canadian Electricity Association's seminar: Setting Up for New Energy Regulation, April 19, 1999.

Using Risk as the Maker of Prices: Risk-Based Pricing, presented at Infocast's conference: Power Industry Retail Pricing, June 23–25, 1999.

"Designing a Retail Pricing Product Mix for a Competitive Market: A C-VALU Case Study," presented at EPRI's Innovative Pricing Conference, Washington, DC, June 18, 1998, (with Kathleen King and David Kulha).

"Retail Products & Pricing in the Competitive Era," presented at IBC Conference: Successfully Implementing Retail Access, Washington, DC, April 27, 1998.

"Risk-Based Pricing: Making Money in Competitive Markets," EMACS Conference, Atlanta, Georgia, October 14, 1997, (with A. Faruqui, EPRI).

"Real-Time Pricing: Becoming Competitive Before Competition," presented at IBC Conference: Successfully Implementing Retail Profit Projects, Atlanta, Georgia, February 24, 1997, and Las Vegas, Nevada, July 17, 1997.

"Effective Retail Product Design for a Competitive Market," IBC Conference: Developing, Negotiating and Contracting Retail Electricity Prices, Atlanta, Georgia, February 24, 1997, (with Kathleen King).

"Innovative Pricing and Data Requirements," presented at the AEIC Load Research Conference, Washington, DC, August 4–6, 1995.

"Lessons Learned and the Path Forward," presented at EPRI's National Conference on Achieving Success in Evolving Electricity Markets, Atlanta, Georgia, October 10–12, 1995 (with Kathleen King).

"A Real-Time Pricing Primer: Service Design for a Competitive Market," presented at the Missouri Valley Electric Association Marketing Division Conference, Kansas City, Missouri, October 13, 1994.

"Real-Time Pricing: Service Design for a Competitive Market," presented at the American Public Power Association workshop, Scottsdale, Arizona, September 28, 1994.

"Customer Response to Real-Time Pricing: Results from Current Experiments," presented at the 6th National Demand-Side Management Conference, Miami Beach, Florida, March 25, 1993.

"Electricity Pricing Innovations for Retail Sales," presented at the Energy Utilities and Regulation Course, Wisconsin Public Utilities Institute, September 13, 1990; revised and presented again in 1992.

"Innovative Pricing in DSM: Recent Field Tests of Real-Time Pricing," presented at the Energy Demand-Side Research Seminar Series, University of Wisconsin-Madison, April 4, 1990 (with D. W. Caves).

**Testimony:**

Panelist in Cost-of-Service Methodology review hearings on behalf of Nova Scotia Power, before the Nova Scotia Utilities and Review Board, proceeding NSUARB-NSPI-P-892, Matter No. M05473, December 2013.

**EXHIBIT BRC 2. MEMORANDUM RE O&M COSTS FOR SPECIFICALLY ASSIGNED ASSETS**

CHRISTENSEN ASSOCIATES ENERGY CONSULTING

Christensen Associates Energy Consulting, LLC
800 University Bay Drive, Suite 400
Madison, Wisconsin 53705-2299

Voice 608.231.2266 Fax 608.231.2108
www.caenergy.com

# MEMORANDUM

TO: Kevin Fagan, Newfoundland & Labrador Hydro

FROM: Bruce Chapman[1]

DATE: February 28, 2017; revised October 6, 2017

SUBJECT: Direct Assignment of Transmission Assets and O&M Costs

## Context

In the recently concluded proceeding pertaining to Newfoundland and Labrador Hydro's (Hydro's) 2013 GRA, the Public Utility Board (PUB) rejected Hydro's proposal to modify its method by which operating and maintenance (O&M) charges are calculated for customers with transmission lines and terminal stations dedicated to their use. At present, customers served by such facilities pay Specifically Assigned Charges, a component of which consists of O&M charges meant to pertain to these facilities. The O&M component is based on the share of the customer's transmission assets in total Island transmission assets, valued at original cost.

Hydro's proposal, at the suggestion of an Industrial customer, Vale, was to value these assets at current cost. In making the proposal, Hydro computed the impact of the change in methodology on the Industrial customers as a whole, on individual customers, and on other customer classes. The PUB, in rejecting the proposal, asked Hydro to document industry practice to evaluate how this costing issue is handled elsewhere. This memorandum reports on research for that purpose.

## Approach

CA Energy Consulting conducted interviews via telephone and email with a number of Canadian and U.S. utilities, attempting to locate utilities that undertake direct assignment of transmission assets. We inquired about the incidence of direct assignment and, for those who do so, we asked how the initial construction costs of such assets are recovered and what costing practices

[1] Assistance was provided by Michael O'Sheasy, Robert Camfield and Nicholas Crowley.

are with respect to the O&M expenses engendered by development of new radial lines and terminal stations.

We obtained information from five large Canadian utilities and about 22 U.S. utilities of varying sizes. The U.S. number is approximate because we received evidence regarding some utilities via sources who described their experience with more than one utility. As such, some utility experiences may not indicate general practice by the utility but instead management of special circumstances or special contracts.

**Summary of Results**

We found the practice of direct assignment of transmission assets to be in use at several utilities in Canada and relatively rare in the United States. All five Canadian utilities contacted use direct assignment of transmission assets to some degree. Of these five, two utilities – BC Hydro and Hydro-Quebec – directly assign O&M costs in some manner based on the assets directly assigned.

- BC Hydro charges customers directly for actual O&M costs that exceed a predetermined "normal" level determined by case-specific factors, and based on O&M costs on their system. (Their Transmission Extension Policy is currently under review, so practice regarding O&M charges may change as part of this review.)
- Hydro-Quebec treats O&M costs in the same manner as initial costs, directly assigning them to Large customer categories and allocating to class based on a 1 NCP allocator.

NB Power separately identifies O&M costs associated with dedicated transmission assets, but allocates these to rates by means of a coincident peak allocator.

Two other utilities – SaskPower and Manitoba Hydro – simply include all additional O&M costs within transmission O&M and allocate those costs to rate class via their preferred allocator.

Our investigation yielded eight cases of direct assignment in the U.S., a minority of the 22 that we contacted or for whom we obtained information indirectly. The utilities engaging in direct assignment use a variety of approaches to recover O&M costs. Some simply bundle all transmission O&M costs together and allocate to class without recognition that some costs pertain to directly assigned assets. However, some are of particular interest to Hydro.

- Bonneville Power Administration allocates O&M costs based on asset measures (circuit-miles of line, type of pole, size of substation/transformer) and applies system per-unit O&M costs pertaining to these facilities.
- Emera Maine, whose directly served transmission customers are generation sources only, allocates O&M costs to these sources based on their share of (undepreciated) transmission assets, valued at original cost.
- A small municipal with a few large customers directly assigns transmission costs and the O&M costs that actually occur on each customer's line. The customers are served under special contract.[2]

[2] This example and the two that follow are from Mark Beauchamp, Utility Financial Solutions.

- Three Nebraska public power districts (PPDs) (Butler, Cedar Knox, and Stanton County) that serve large pumping stations owned by TransCanada Pipeline charged the customer for the costs of transmission line extension and also charge on an ongoing basis for the actual costs of O&M.
- A third Nebraska PPD, Alcorn, directly assigned the cost of transmission facilities to a large customer and charges the customer on the basis of estimated O&M costs. The customer pays a flat fee based on O&M cost indicators from the utility's COS study.

We also conducted an interview with a consultant familiar with an extreme case of a small utility serving large customers.[3] Big Rivers Electric Corporation is a cooperative G&T in Kentucky that at one time served two large aluminum smelters. They treated these customers as a separate rate class, apparently, and assigned all costs related to these facilities to the class. Since this arrangement ended with the closure of the plants, the details of how O&M costs assigned to the class were actually allocated to each customer are not known. Other examples of this situation, in which a utility groups customers whose transmission assets are directly assigned into a single class, and then directly assigns O&M costs associated with those assets to the class, may exist.

If we exclude Emera Maine due to its service to generators only, it appears that this short list of U.S. examples is weighted toward small utilities with a few large customers. This pattern corresponds to the expectations stated in our COS Methodology report, based on industry experience.

The table below provides a summary of utilities contacted (column 1) their use of direct assignment of assets (a "1"in column 2) and their practices with respect to O&M (column 3). In the O&M column of the table, "DA" stands for direct assignment. The abbreviations that follow this identifier are:

- Actual: the utility recovers actual O&M costs.
- Estimated: the utility recovers estimated O&M costs.
- Share: the utility allocates O&M costs among customers with directly assigned assets.
- Bundled: the utility bundles O&M costs directly related to the directly assigned assets with all other transmission costs and applies the allocator used for the relevant transmission account.
- Allocated: the utility separately identifies O&M associated with dedicated transmission assets, then allocates these costs to rate class via a conventional transmission allocator.

The abbreviations simplify utility practice. The appendix provides detail for each utility that directly assigns O&M costs on some basis.

[3] John Wolfram, Catalyst Consulting LLC.

**Utilities That Directly Assign Radial Transmission Assets and/or Associated Operating & Maintenance Costs**

| | Assets | O&M |
|---|---|---|
| **Canada** | | |
| BC Hydro | 1 | DA - actual, excess |
| SaskPower | 1 | bundled |
| Manitoba Hydro | 1 | bundled |
| Hydro-Quebec | 1 | DA-share |
| NB Power | 1 | DA-allocated |
| **United States** | | |
| Investor-Owned | | |
| Commonwealth Edison | 1 | bundled |
| Emera Maine (generators only) | 1 | DA - share |
| Georgia Power | | |
| Gulf Power | 1 | bundled |
| Duke Power | | |
| Duke Energy Carolinas | | |
| Duke Energy Progress | | |
| Oklahoma G&E | | |
| PNM Resources | | |
| Public Service of Oklahoma | | |
| Xcel Energy - Minnesota | 1 | bundled |
| Federal/State-Owned | | |
| Bonneville Power Admin. | 1 | DA - share |
| Santee Cooper | | |
| Tennessee Valley Authority | | |
| Municipal/PPD | | |
| Alcorn PPD | 1 | DA - estimated |
| Anonymous Municipal | 1 | DA - actual |
| Benton, Cedar Knox, Stanton PPD | 1 | DA - actual |
| Big Rivers Electric Corporation | * | |
| Grand Island Electric Department | | |

*Separate rate class - no longer in use

**Implications of Results**

The first implication of this research is that there is no uniform method for associating/determining O&M costs with customers served by dedicated transmission lines and terminal stations.

- Some utilities just bundle transmission costs that could be related to these dedicated facilities in with their other transmission O&M costs.
- A second group allocates O&M costs to direct assignment customers using a variety of allocative methods.
- A third group tracks and directly assigns actual O&M costs to dedicated customers.

The second implication relates to cost allocation. Some utilities make use of a gross (transmission) plant allocator, with gross plant valued at original cost, to split transmission assets between common and directly assigned, and among direct assignment customers.[4] However, there are exceptions. Bonneville uses a somewhat different asset computation, charging on the basis of several categories of equipment and the utility costs of O&M pertaining to that equipment.

The third implication is that few utilities track actual costs by line or terminal station and charge specific customers associated with the facility: one Nebraska PPD does so, and BC Hydro charges for excess costs over its "normal" benchmark.

A fourth implication is that there isn't a wealth of industry practice available to give irrefutable guidance to Hydro or to the PUB regarding O&M cost responsibility associated with dedicated plant. Specifically, although the cases of allocation of O&M costs based on asset value utilize original asset cost, allocation is not the dominant approach, and the numbers utilizing this method are few enough to suggest that Hydro's recommended current valuation should not be ruled out as incompatible with industry practice.

[4] Gross plant often figures in O&M cost allocation. For example, NLH uses gross transmission plant to classify transmission O&M, and then uses a different allocator for each functional classification. Other utilities classify all transmission assets as demand-related and use a single allocator, *e.g.* a CP demand allocator, to allocate both transmission assets and transmission-related O&M. Gross plant plays no role in cost allocation in this case.

**Appendix: Summaries by Utility**

***Canadian Utilities***

**BC Hydro**

BC Hydro directly assigns radial transmission lines that are constructed in response to customer requests. Terminal station construction is the responsibility of the customer. The utility encourages customers to build their own radial lines and to own them. The utility will accept transfer of ownership from the customer if undertaken early in the process. In cases in which the customer is unwilling to build the line, BC Hydro will do so upon request. All costs are the responsibility of the customer, and are paid as incurred via a contribution in aid of construction (CIAC).

In cases of line ownership by BC Hydro, the utility assumes responsibility for a normal level of O&M expenditures, as determined by the utility. This level is based on assessment of customer-specific factors such as remoteness of the customer site and roughness of the terrain. Above-normal expenditure is assigned directly to the customer associated with the line.

Note that BC Hydro's Transmission Extension Policy is currently under review. The current policy dates from 1991.

**SaskPower**

SaskPower directly assigns connection costs associated with radial lines designed to serve a single customer. The customer pays the full cost under a CIAC scheme.

- The utility interviewee mentioned that, under IFRS, CIAC is recognized as "other income" and functionalized to transmission. Rate base accounts are augmented by construction costs. This appears to be a departure from previous North American practice under GAAP, in which rate base account increases were directly offset by matching CIAC expense, resulting in no change in rate base.

Increases in OM&A costs associated with the new connection are included with all Transmission OM&A and allocated together. Initial OM&A expenses associated with the act of connecting are included with the CIAC.

**Manitoba Hydro**

Manitoba Hydro directly assigns the costs of radial lines to the customers requesting them. Customers are responsible for the construction of their own terminal stations. Construction costs of radial lines are recovered via CIAC. CIAC is netted against the cost of rate base change by account. There is no effect on rate base.

All increases in O&M costs are deemed common and are recovered through standard tariffs.

**Hydro-Quebec**

Hydro-Quebec directly assigns to customers applying for radial transmission service only the amount that exceeds a maximum dollar allowance, as defined by the utility. Customer must pay any excess in advance, in a CIAC. However, the customer must reach an agreed usage level. Failure to reach this level results in the customer having to pay that maximum allowance as well.

Assuming that the customer does reach the agreed level, the maximum allowance is entered into rate base. These costs are assigned to the Medium and Large Customer rate categories and then allocated to rate based on a 1 NCP allocator developed for the categories.

**NB Power**

NB Power directly assigns radial transmission line and substation costs to customers. These customers include large industrial accounts and two municipalities. Customers pay in full for these assets either via CIAC or by monthly lump-sum installments over the life of the asset.

Perhaps of interest, this approach is being challenged by customers who self-generate. They argue that, since they are now providing generation to the grid, they are not responsible for the full asset and OM&A costs of the grid.

NB Power incorporates these dedicated transmission asset values into total asset valuation (at original cost) and payments are amortized into revenues.

The utility has recently modified its COS methodology to separately identify O&M costs associated with dedicated transmission. These costs are not assigned directly to associated customers but instead allocated to rate class based on a coincident peak allocator. This allocation takes place separately from the allocation of common transmission-related O&M costs. (NB Power does not charge the customer directly for actual OM&A expenses as incurred. Accounting practice does not permit this.)

***United States***

**Commonwealth Edison**

ComEd builds and maintains transmission assets, including those that are considered radial and serving a single customer or defined small number of customers. However, their accounting system is not capable of identifying such assets. The bulk of the utility's transmission costs generally are recovered via revenue recovery calculations submitted to PJM and the FERC. The exception is the costs of facilities developed and built by ComEd in response to specific interconnection requests, for which the company charges the customer and receives CIAC. The CIAC amount generally covers the full cost of the new facility, or the full cost directly attributable to the customer submitting the request.

O&M costs of the new facilities are all treated as common and recovered via revenue recovery submissions.

**Emera Maine**

The case of Emera Maine may be less applicable to Hydro's interests in that the customers connected to the grid via directly assigned transmission line costs are remote generators, some of which are wind farms. Customers pay all construction costs via CIAC, not in a single lump sum but instead in installments that can stretch past the period of completion of construction. It should be noted that these facilities tend to be relatively short lines, and thus do not represent significant risk to the utility, at least relative to the risk exposure of smaller utilities.

The utility also finds a middle ground regarding O&M between charging actual cost and socializing all costs. Customers pay O&M based on the radial lines' share of total transmission assets valued at original cost, applied to total transmission O&M costs. The charge is imposed on a lump-sum basis, as a customer-specific fee. The charge is updated annually.

**Xcel Energy – Minnesota (Northern States Power)**

Xcel Energy charges customers for directly assigned assets via CIAC. As with other large utilities, it does not attempt to identify O&M costs associated with these lines. Instead, the additional O&M costs are included with all others and allocated across rate classes in the standard manner.

**Bonneville Power Administration**

BPA has dedicated transmission lines and substations in a variety of sizes matching customer needs. The costs of these facilities are recovered in advance from customers under PFIA (Projects Funded in Advance) payments. These costs are non-refundable, making PFIA payments equivalent to CIAC. Assets are owned and operated by BPA. Rate base is not affected by the construction of dedicated facilities.

O&M costs for these facilities are covered under about 150 customer contracts, each of three years' duration, renewing in staggered fashion over time (as opposed to all at once). O&M costs are based on seven-year cost averages. Costs are assigned to customers based on circuit-miles of line, steel or wood poles supporting them, and size of substation/transformer, valued at original, undepreciated cost. In short, the asset values of the facilities are customer-specific while the O&M costs are generic to the transmission function at BPA. Customers thus pay assigned customer-specific O&M costs plus generic transmission-related O&M, the latter being based on standard tariff pricing (in turn based on allocation of common costs).

**Anonymous Municipal**

This example, also reported by Mark Beauchamp[5], involves a municipal utility that serves a small number of large industrial customers via radial transmission lines. In this case, the customer contracts require the customer to pay the full cost of their assessment via CIAC. Additionally, the customers are responsible for all capital replacement costs. Additionally,

[5] Result of telephone interview with Mr. Beauchamp. (His name is pronounced as it would be in French.)

customers pay for all O&M costs as they are incurred. This is an excellent example of the small utility/large customer combination that results in direct assignment.

The utility has structured its special contracts to match costs associated with these customers as closely as possible to revenues, a strategy for minimizing utility risk. An additional feature is a utility requirement of surety bonds that secure payoff to the utility in the event of customer shutdown. (This is an approximate counterpart of Hydro-Quebec's requirement that the minimum allowance be paid in similar circumstances.)

The example is required to be anonymous at the request of the utility.

**Public Power Districts in Nebraska**

Mr. Beauchamp also provides two examples from his experiences in Nebraska. The first example concerns three utilities that provide electric service to TransCanada Pipelines pumping stations. (The utilities are Butler, Cedar Knox, and Stanton County PPDs.) As with the municipal utility example above, the contracts under which the pumping stations are served are designed to minimize utility risk. The general context involves the utilities providing energy supply services on a pass-through basis and distribution services priced to cover all other expenses.

The utility also covers its risks by charging the customer for the actual costs of O&M as the costs are incurred. As might be imagined, a less direct arrangement would expose other customers of the PPDs to fluctuating and significant costs.

The second example, Alcorn PPD, involves a transmission line that connects an ethanol plant. In this case, the utility partially collected its construction expenses via CIAC but then charged the customer a significant share of construction costs via a facilities charge, a monthly lump sum.

O&M charges are indirectly the responsibility of the customer in that the utility determined a rate for the length of the line based on its transmission O&M costs in its COS study. This cost is recovered via a flat fee whose size changes with each COS study, but does not connect charges directly to actual line costs.