

1 Q. **Volume II, Exhibit 11: Depreciation Study**

2 Please provide all studies and any other relevant materials that were used by  
3 Concentric Advisors to arrive at the estimates of Net Salvage Percentage in the  
4 2015 Depreciation Study. (Volume II (1st Revision), Exhibit 11: Depreciation Study,  
5 Pages 49-52 of 628, Table 1B)

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7

8 A. This response has been provided by Concentric Advisors (Concentric).

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10 Please refer to NP-NLH-145, Attachment 1, which is a summary of discussions held  
11 in St. John's, Newfoundland on April 12-14, 2016. Also, please refer to NP-NLH-145,  
12 Attachment 2, which provides peer net salvage comparators. As stated in the  
13 Concentric Depreciation Study Report, Page I-6 the procedure for estimating cost of  
14 removal to a large extent relied upon the approved cost of removal parameters for  
15 Newfoundland Power's (NFP) 2015 depreciation study. This study was prepared by  
16 Gannett Fleming in September 2015. It is Concentric's view that this study was  
17 reviewed by Newfoundland and Labrador Board of Commissioners of Public  
18 Utilities. NFP's cost of removal percentages reflect their different cost of removal  
19 accounting policy and should be higher percentages than what would be expected  
20 for Hydro. Hydro did not have actual cost of removal by fixed asset account  
21 however they were able to supply total corporate cost of removal for the period of  
22 2012 to 2015 which equated to approximately -10% of the same period actual  
23 retirements. Concentric viewed that its account cost of removal recommendations  
24 in total should also approximate the above total corporate -10% cost of removal. A  
25 global reduction was selected that resulted in Concentric's cost of removal  
26 recommendations which in total approximate Hydro's 2012 to 2015 actual cost of  
27 removal of -10%. Concentric viewed this reduction to properly reflect the differing

1 accounting policies related to cost of removal between Hydro and Newfoundland  
2 Power as described in the Depreciation study on page I-6 to I-7. Concentric views  
3 that the application of its recommended account cost of removal rates are  
4 appropriate on a total corporate basis. There may be some accounts with higher  
5 actual removal costs and others with lower actual removal costs. As Hydro gains  
6 more actual removal experience by account, Concentric will review the actuals and  
7 evaluate if different cost of removal estimates are warranted.

## HYDRO MANAGEMENT REVIEW

### April 12-14, St. John's Newfoundland

#### April 12, 2016

- Policy Papers
  - ELG/ALG
    - Hydro is currently using ALG on a unit basis
    - NFLD Power uses ELG since 1990's
      - Was phased in on a prospective basis then in late 1990's incorporated to all vintages.
  - Net Salvage
    - NFLD Power incorporates net salvage in its depreciation rates.
  - Accumulated Depreciation True Up
    - For the first ELG group depreciation study there will be no true-up of the accumulated depreciation reserve.
    - Next GRA the true-up will begin.
- Strategy on Depreciation Study
- Dams
  - Active condition assessment program
  - Routine surveillance
    - Inspections
    - Engineer assessment on annual basis. High classification dams have engineering assessment twice annually.
    - Independent external assessment every year
    - Dam safety review (started in 2007)
      - Stability
      - Emergency preparedness
      - Design checks/intent
      - Dam classification
      - No underground assessment done
    - No large capital programs upcoming, just typical capital expenditures
    - Mostly Embankment dams, fewer concrete dams
      - Water containment via earthen dams
      - Hydraulic structures, concrete dams/spillways etc. to pass water
      - Power canals convey water to intakes
    - Embankment Structures
      - More capital maintenance
      - More susceptible to erosion
      - Remote locations cause more costs due to access

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- Roads also serve for general public, hunters, etc.
- More new costs for public safety, risk assessment for public use of dams include buoys, booms, signage, fencing, etc
- No new large capital programs
- Standard maintenance
- Section of Power canal failed in 1982. Since then diving inspections annually to check the liner in the canal;
- No decommissioning or rebuilds of dams
- No large capital programs; just usual capital maintenance and public safety work
- Inspections – survey monuments to measure movement
  - Rip rap augmentation – retirements are processed for loss of materials.
- Downstream of concrete dams/spillways
  - Flip buckets usually downstream
  - Erosion of concrete
  - No major issues.
- Concrete dams – 2
  - No major upcoming work.
- Feasibility to remove/decommission a dam
  - Could be a risk (environment, fisheries) to leave a bad condition dam
- End of life
  - Not hearing that there is an end of life. Will be a structure there. No anticipated replacement required for aging dams, just maintenance and capital work as required
  - Oldest dam for Hydro generation is 1956 – was a mining dam
- General agreement that 110 years is reasonable at this point in time.
- Earthquake design criteria
  - Calculated as per CDA Guidelines but generally No concerns.
- Gates
  - All but one of concrete dams have gates
  - Used for spillway and control
  - Primarily steel gates
  - Some wooden stop logs, mostly steel stop logs
  - Annual inspections
    - Corrosion
    - Seals
    - Leakage
    - rollers
  - Constant maintenance to maintain rather than replacement
  - 80 year life
    - Planned regular maintenance
    - Longer than most other hydro
    - Gate Inspection
- Remove dams
  - Removal costs vs rebuild dams

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- No removal experience
    - Issue with leaving dam or decommissioning
  - Powerhouse – separate structure
  - Spillway structure – concrete (same as gates above)
    - Concrete and rock interface
    - Should be same life as dams.
- Exploits Assets
  - Hydro Electric and Substations – Dave Hicks
  - Powerhouse
  - Rewind of generator
    - First one in 40 years.
  - Breaker transformer are capital activity
  - Magnitude of overhaul before it is capital
  - Circuit Breakers – 46 Airblast Breakers to be replaced by SF6 breakers over next 5 years.
- Substations
  - Breakers C09
    - Some oil breakers
    - Some PCB breakers to be removed over next few years
  - GIS – good experience, little maintenance
  - Transformers T05
    - 6 Bay d’Espoir (old transformers)
  - Protection Systems P12
    - New protection systems may not work will with old transformers.
    - No retirements
- Poles and Conductors
  - Steel Poles – few thousand
    - Hard to climb in remote areas
  - Towers
    - No salt water issues
    - Tower painting program to extend life
    - V Tower is back bone tower
    - Some hybrid wood and steel towers
  - Less issues with land rights and population
  - Distribution - <= 25kV
  - Transmission – 45kv, 69kv, 138kv, 230kv
    - 45kv sub-transmission but considered D
    - In Labrador
- Conductor
  - No main issues
  - Small communities are converting to electrical power sources so need to upgrade conductor size
    - Long term plan to convert
  - Mainly bare but some coated
    - Some issues with coated with cracking and then moisture issues

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- Conductor has generally longer life than poles.
- Conductor will deteriorate with age
  - Corrosion with core.
- Thermal scans to detect corrosion issues (fly by with helicopters)
- No salt water issues
- Similar peer lives
- Insulators
  - Porcelain and glass used
    - Older system was more porcelain
    - Newer are 50%/50% porcelain/glass
  - Have not used much new technology in insulators
  - Labrador
    - Less salt, drier and less wind
  - Some issues with people and target practice on insulators
  - Slightly shorter lives than non-costal areas.
  - C13 – Transmission
    - 60 year ASL makes sense and R3 makes sense considering all causes of retirements
  - C14 – Distribution
  - Good Accounting with additions and retirements apparent.
- O/H Transformers – T05
  - Transformers are monitored
  - Intuitive sense for increased life (55-R3)
- Distribution
  - Comparison to NFLD Power (urban area)
  - Rural NALCOR may be longer due to less urban moves
- Pad Mounted
  - Probably more Transmission
- P04/ P05
  - P04 - Guy wires, anchors, clamp, cross arms
  - Good relationship between P04 and P05
  - Good mixtures of T (shorter) and D (longer) poles
  - Water areas have untreated poles due to environment issues
  - Salt – no much effect on lives
  - Cold – poles are frozen a lot of the time and climate is dryer in NFLD.
  - Treatment in non-water areas is boron rods
  - First inspection is after 20 years and treatment and then 10 years after that
- P05 – Transmission
- P07 – Distribution
  - Shorter than industry average
  - Paul indicated life is too short
  - Longer life and lower mode.
  - Took over old assets (1980's)
    - Labrador City Ireland Company
- Remove Line

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- No hot line work
- Build new line next to old and then transfer conductor
- Unit costs to remove poles for COR costs.
- Gas Turbines
  - Isolated Generation is diesel only – except Ramea which has some wind
  - Gas Turbines – 4 in system
    - Stand by and peaking/emergency
    - Support outages
    - Feed to substation then to Distribution
    - 2 gas turbines to feed 1 alternator – Hardwood and Stephenville plants
      - Same gas turbine as Concorde – Rolls Royce
    - 1992 Pratt Whitney (25 MW) – Happy Valley unit
    - 2015 should have G03 (\$31M addition) – Holyrood gas turbine
    - Little historical use – existing units
    - Higher usage could come from more base load
    - Start ups or lots of hours cause wear and tear
    - Fuel is diesel not natural gas
      - Brought in by trucks
    - Could be considerable contamination to clean up at older sites HWD, SVL
      - COR or ARO?
- Diesel
  - 3 different sizes for various load profiles and redundancy is typical
  - If marine delivery then needs lots of fuel tanks(storage) due to winter freeze up and no accessibility for deliveries
  - Combination generators and alternators - gensets
  - 20-25 year life seems reasonable.
  - Environmental clean up issues at end of life, particularly for older plants
- IT
  - 4 years for laptops
  - 5 years desktops/ servers (virtual) could be 6-7 years
  - 6 years for peripheral's/Printer
  - < \$1000 is expensed
  - Microsoft Enterprise (agreement to download software)
    - 3 years
  - Software
    - 7 years
    - Microsoft usually a drop dead limit of 10 years
      - Usually get out a few years prior to the 10 year deadline
    - JD Edwards – Business Enterprise System 1

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NEWFOUNDLAND AND LABRADOR HYDRO

SCHEDULE 3. SUMMARY OF AVERAGE SERVICE LIFE ESTIMATES OF PEER CANADIAN ELECTRIC UTILITIES

DESCRIPTION	Client: Study date:	ATCO ELECTRIC 2014*	ALTALINK LP 2014	BC HYDRO 2005	ENMAX POWER CORPORATION 2012**	FORTIS ALBERTA, INC. 2010	FORTIS BC INC. 2014	MANITOBA HYDRO 2014	NB POWER 2014	NEWFOUNDL AND POWER INC. 2014	NWT POWER CORP. 2011	QULLIQ ENERGY CORPORATI ON 2008	SASK POWER 2009	YUKON ELECTRICAL COMPANY LIMITED 2011
<b>DISTRIBUTION PLANT</b>														
LAND AND LAND RIGHTS		75 - R3			60 - R3	36 - L3	75 - R4			65 - R4			35	75 - R3
SUBSTATION STRUCTURES AND IMPROVEMENTS		40 - R2.5				25 - L1					40 - R1.5	40 - R2	40	
BUILDINGS					65 - R4	40 - R1.5							40	
SITE DEVELOPMENT					50 - R4								40	
STORAGE BATTERY EQUIPMENT												15 - R3		
POLES, TOWERS AND FIXTURES		45 - R2.5				45 - R1.5	50 - R2.5	65 - S0.5			45 - R3	38 - R3		40 - R3
WOOD POLES					50 - R1.5				53 - R1	53 - R1				
OVERHEAD TRANSFORMERS					50 - SQ									
INSULATORS					60 - SQ									
CONCRETE AND STEEL									44 - R2.5	44 - R2.5				
STEEL TOWERS								60 - R3	50 - R3	50 - R3				
OVERHEAD CONDUCTOR		55 - R2.5				45 - R1	49 - R3	60 - R1.5	57 - R2.5		45 - R4	40 - R3	35	45 - R4
PRIMARY CONDUCTOR					50 - R1.5									
SECONDARY CONDUCTOR					60 - R3									
FAULT INDICATORS					65 - R2									
SWITCHES					55 - R2									
BARE COPPER										53 - R1.5				
WEATHER-PROOF COPPER										49 - R2.5				
BARE ALUMINUM										57 - R2.5				
WEATHER-PROOF ALUMINUM										36 - R1.5				
AERIAL CABLE										29 - R1				
DUPLEX, TRIPLEX, AND QUADRUPLX										49 - R2				
UNDERGROUND CONDUIT		55 - R4							47-65 - R4		45 - R4	25 - R3		45 - R3
TRANSOFMRER PADS					40 - SQ									
PULL BOXES					65 - SQ									
MANHOLES					55 - SQ									
UNDERGROUND CONDUCTOR					60 - SQ					65 - R4				
PRIMARY CABLE						58 - R2			47 - R4	47 - R4	25 - R3	25 - R3	35	
SECONDARY CABLE					45 - R3			60 - R3						
SWITCHES					45 - R3			44 - S3						
SPECIAL INSULATED COPPER CABLE					32 - R3					40 - R3				
SCADA										29 - R1				
AMR														
AMR - SKID INFRASTRUCTURE														
VOLTAGE REGULATORS														
CAPACITOR BANKS														
RECLOSERS														
CAPACITORS AND REGULATORS														
STREET LIGHTING AND SIGNAL SYSTEMS		43 - R4				20 - R1	27 - L2		20 - R0.5	20 - R0.5	45 - R4	35 - S1.5	30	30 - R3
SENTINEL LIGHTS		31 - R1												23 - R2
TELECONTROL LINKS					35 - SQ									
SUPERVISORY EQUIPMENT					15 - SQ									
STREET LIGHT POLES				40 - R3		45 - R1.5							35	
SERVICES							75 - R4				55 - R4	40 - R3		
OVERHEAD		50 - R4								49 - R2			35	45 - R3
UNDERGROUND		50 - R3								45 - R4			35	40 - R4
METERS		20 - R1.5		25 - R2	25 - SQ				20 - R1		20 - R3	25 - S2		
AMI									20 - SQ	15 - L3			15	
AMR		15 - R2.5				15 - R0.5				15 - L3				15 - R2.5
WATT-HOUR								26 - L1.5		18 - S1	18 - S1			
DEMAND										18 - S1	18 - S1			
INSTRUMENT TRANSFORMERS										36 - R2.5	36 - R2.5		15	
METERING TANKS										36 - R2.5	36 - R2.5			
INSTALLATIONS ON CUSTOMER PREMISES							20 - R1				20 - R3	25 - S2		

NEWFOUNDLAND AND LABRADOR HYDRO

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<b>GENERAL PLANT</b>														
STRUCTURES AND IMPROVEMENTS		40 - R2.5	45 - R2		100 - R1				70 - R1			45 - R3		40 - L3
LEASEHOLD IMPROVEMENTS					5 - SQ									
HOUSES		12 - L0												40 - R3
FRAME AND IRON							51 - S1.5							
MASONRY							41 - S3							
GENERAL														
SCADA														
BUILDINGS								40 - R4						
LARGE										70 - R1	100 - R2			
SMALL									37 S0	37 - S0	15 - L3			
OFFICE FURNITURE AND EQUIPMENT		15 - SQ	15 - SQ		20 - SQ	15 - SQ	15 - SQ		25 - SQ	25 - SQ		5 - SQ		15 - SQ
COMPUTERS								5 - SQ			5 - SQ			
FURNITURE								20 - SQ			15 - SQ		15	
EQUIPMENT								20 - SQ					10	
COMPUTER HARDWARE			5 - SQ											
TRANSPORTATION EQUIPMENT			8 - L2.5		13 - L3		13 - L2.5				7 - S1	12 - L1.5		12 - L0
CATEGORY 1		8 - L1.5												
CATEGORY 2		9 - L2												
CATEGORY 3		18 - SQ												
CATEGORY 4		10 - L3												
FLEET VEHICLES						5 - L1								
CORPORATE VEHICLES						3 - SQ								
OTHER						14 - S4				15 - L1.5				
CARS				8 - L2.5				11 - S2		6 - R4				
LIGHT TRUCKS				8 - L2.5			10 - L1	12 - L4	6 - R4	6 - R4			7	
MEDIUM TRUCKS				13 R1.5						11 - R3			12	
HEAVY TRUCKS				13 R1.5			15 - L3	19 - L4	11 - R3	11 - R3			12	
TRAILERS				20 - R1.5				35 - S1					20	
HEAVY EQUIPMENT								23 - R2.5					25	
SNOWMOBILES AND ATV'S				20 - R3										
STORES EQUIPMENT								25 - SQ	25 - SQ	25 - R3	25 - R3			
TOOLS AND WORK EQUIPMENT		7 - SQ	10 - SQ		20 - SQ	10 - SQ	15 - SQ	15 - SQ		25 - SQ	15 - SQ	15 - SQ	10	15 - SQ
METER READERS													8	
LABORATORY EQUIPMENT								25 - SQ	25 - SQ	25 - SQ	20 - SQ			
HEAVY WORK EQUIPMENT														
POWER OPERATED EQUIPMENT			25 - L2								27 - S1.5	20 - L1		
COMMUNICATION STRUCTURES AND EQUIPMENT		25 - R2					15 - SQ				20 - R3	25 - R3		15 - SQ
RADIOS					15 - SQ			8 - SQ	15 - SQ	15 - SQ				
MOBILE						7 - SQ		8 - SQ	15 - SQ	15 - SQ				
BASE STATIONS														
RADIO SITES - ROADS									30 - R4	30 - R4				
RADIO SITES - BUILDINGS									30 - R4	30 - R4				
COMMUNICATION CABLES								35 - R2.5	25 - R3	25 - R3				
SCADA									15 - L2	15 - L2				
TELEPHONE				20 - R2					10 - L2.5	10 - L2.5				
POWER LINE CARRIER								15 - S1.5		15 - SQ				
TEST EQUIPMENT										15 - R3				
COMPUTER SYSTEMS						3 - SQ								5 - SQ
SOFTWARE		5 - SQ	5 - SQ		5 - SQ	5 - SQ	8 - SQ	10 - SQ	10 - SQ	10 - SQ	5 - SQ		5	
HARDWARE		5 - SQ	5 - SQ		5 - SQ	5 - R4	5 - SQ	5 - SQ	5 - SQ	5 - SQ	5 - SQ		4	
ENTERPRISE SOFTWARE		7 - SQ			10 - SQ									
INFORMATION SYSTEMS														
SAP							10 - R4							
MAJOR APPLICATIONS		3 - SQ					5 - R4							
LOAD SETTLEMENT SOFTWARE							5 - R4							
MISCELLANEOUS EQUIPMENT									15 - SQ	15 - SQ	15 - SQ	15 - SQ		
ENVIRONMENT														
ENGINEERING										25 - SQ				
OTHER TANGIBLE PLANT											20 - SQ			

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<b>NETWORK ASSETS</b>														
POLES, TOWERS AND FIXTURES														
WOOD					50 - SQ									
OVERHEAD CONDUCTOR														
PRIMARY CONDUCTOR					50 - SQ									
SECONDARY CONDUCTOR					60 - SQ									
UNDERGROUND CONDUIT					40 - SQ									
TRANSFORMER PADS					55 - SQ									
PULL BOXES					60 - SQ									
VAULTS					60 - SQ									
MANHOLES					60 - SQ									
UNDERGROUND CONDUCTOR														
PRIMARY CABLE					30 - SQ									
SECONDARY CABLE					40 - SQ									
SWITCHES					40 - SQ									
TRANSFORMERS														
OVERHEAD					45 - SQ									
UNDERGROUND					45 - SQ									
PADMOUNT					45 - SQ									
SWITCHGEAR					45 - SQ									
TELECONTROL SYSTEM														
TELECONTROL LINKS					45 - SQ									
SUPERVISORY EQUIPMENT					45 - SQ									

\* Pending Application

\*\* Compliance Filing