

1 **Q. Reference: Volume III, Exhibit 8 - 2024 Technical Update**

- 2 **a)** Which asset accounts experienced changes in Average Service Life recommendations
3 between the 2019TY study and the 2027TY study?
- 4 **b)** Were the revisions driven by statistical evidence, engineering judgment, or
5 management expectations?
- 6 **c)** For major generation, transmission, and distribution assets, what retirement experience
7 has occurred since the last study that supports shortening or extending asset lives?
- 8 **d)** How do the proposed asset lives align with Hydro's long-term asset management and
9 capital plans?

12 **A. a)** Please refer to PUB-NLH-076, Attachment 1.

13 **b)** Please refer to PUB-NLH-076, Attachment 1.

14 **c)** Please refer to PUB-NLH-076, Attachment 1.

15 **d)** The proposed Average Service Lives are generally consistent with Newfoundland and
16 Labrador Hydro's ("Hydro") long-term asset management and capital plans. The
17 depreciation study treats service lives as account-level averages, recognizing that individual
18 assets will retire both before and after the average life. The proposed lives reflect historical
19 retirement experience, Hydro's operating and retirement outlook, and industry practice.

20 Hydro's capital planning similarly does not use age as an automatic replacement trigger. Age
21 is one input considered alongside condition, usage, performance, reliability, obsolescence,
22 operating requirements, and risk. Hydro emphasizes condition-based investment rather
23 than age-based investment where appropriate, and its asset management programs use age
24 and condition to determine when assets should be inspected, refurbished, life-extended, or
25 replaced.

1 This is evident in Hydro’s capital plans, which include a mix of life-extension work, recurring
2 overhauls, condition assessments, targeted refurbishment, and replacement of end-of-life
3 assets. Overall, the proposed Average Service Life provides a reasonable long-term
4 retirement expectation for asset groups, while actual capital decisions are made based on
5 the condition and circumstances of individual assets.

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Account	Account Description	Previous Study Survivor Curve	Recommended Survivor Curve	Explanation for Change in Average Service Life	Impact of Retirement History Since Last Study
A04	AUXILIARY POWER SYSTEMS	30-R4	25-R4	Discussions with management indicate that the auxiliary systems are subject to retirement between the ages of 20 and 25 years due to the failure of the Programmable Logic Controller (PLC) systems. Additionally, it is noted that the investment in this account has increased substantially in recent years. Approximately \$10 million of the total \$13.8 million exposures have been added within the 11.5 years prior to the date of the study. These assets have not yet been in service for long enough to expect a substantial number of retirements.	Limited weighting was placed on the historical retirement data.
B01	BATTERY AND POWER SYSTEMS	26-L1.5	20-L1.5	Concentric placed more weighting on the comments from management and subject matter experts, who indicated that the longest lived batteries survive for approximately 25 years, with most reaching the end of life by age 20. Additionally, changes in technology and vendor availability result in average service lives that are shorter than those which have been experienced historically.	Limited weighting was placed on the historical retirement data.
B05	BUILDINGS - OTHER	50-R0.5	55-R1	The buildings account includes the head office in St. John's, which places NLH on the longer end of peers. There have not been extensive renovations to the St. John's building to date, which indicates a life extension may be warranted. Additionally, the historical data indicates that a life extension is warranted at this time. The currently approved Iowa 50-R0.5 has a residual measure of 0.966 while the recommended Iowa 55-R1 has a residual measure of 0.6018	The additional 9 years of retirement data collected since the last depreciation study indicates a life longer than the currently approved 50 years. While the total exposures at age 0 have increased by approximately \$26 million, the overall shape of the survivor curve has not changed substantially. The retirements that have been experienced have occurred at older lives, which indicates the need for a longer average service life.
C04	CABLES - ABOVE GROUND	60-R4	65-R4	The peer range for this account is 40 to 85 years. The move to 65 years places NLH more firmly within the range. Additionally, the life extension aligns with a better fit to the historical data. The currently approved Iowa 60-R4 has a residual measure of 0.6979 while the recommended Iowa 65-R4 has a residual measure of 0.4251.	The additional 9 years of retirement data collected since the last depreciation study indicates a life longer than the currently approved 60 years. While the total exposures at age 0 have increased by approximately \$5 million, the overall shape of the survivor curve has not changed substantially.
C09	CIRCUIT BREAKERS	60-R2.5	55-R2	The recommended Iowa 55-R2 provides a better mathematical fit to the historical data, with a residual measure of 0.2913 as compared to the currently approved Iowa 60-R2.5 with a residual measure of 0.3789. This is particularly evident through the age of approximately 25 and again from age 47.5 through 54.5.	The total exposures related to this account have increased substantially since the last depreciation study. Exposures at age 0 in the 2019 study were \$42 million, while exposures at age 0 in the current study are \$116 million. This indicates that there have been extensive additions in the years since the previous study, which may indicate a change in the type of assets being studied. This account has also shown a large increase in retirements through age 9.5 since the last study - from approximately \$758 thousand to over \$2.9 million. This increase in early retirements further confirms that a life shortening is necessary at this time.
C14	CONDUCTOR - DISTRIBUTION	45-R3	48-R3	The peer range for this account is 25 to 60 years. The move to 48 years places NLH at the higher end of the peer range, which is appropriate given the peers considered. Additionally, the historical data indicates that a life extension is warranted at this time, with the currently approved Iowa 45-R3 providing a residual measure of 1.4663 while the recommended Iowa 48-R3 provides a residual measure of 1.1212.	The retirement experience to date has shown retirements at later ages as compared to the previous depreciation study. While the 45-R3 was a good fit to the historical experience at the time of the last study, the additional 9 years of data has pushed the average service life longer than was previously seen.
C15	CONTROL, METERING, RELAYING	40-R3	35-R3	Changes in technology have led to obsolescence after 15 to 20 years for many assets within this account due to lack of vendor availability of parts. This is reflected in the data through age 30, which indicates that a life shortening is necessary at this time.	The exposures at age 0 in this account have nearly doubled since the last depreciation study. With this has come a large increase in the retirement experience prior to 20 years of age, with an increase from \$700 thousand to \$2.3 million. This increase in retirements significantly prior to the average service life currently approved aligns with the need to reduce the average service life for this account.
C21	CELL PHONES	New Account-	3-SQ	It is expected that cell phones will be replaced every 3 years on average.	N/A
C22	CHARGING STATION	New Account-	10-SQ	Based on peer review.	N/A
D02	DIESEL SYSTEMS AND ENGINES	25-L0.5	22-L0.5	The historical retirement information through age 30 indicates that a life shortening is necessary. Concentric recommends a step change in the interest of gradualism and moderation.	There has been a dramatic shift in the historical data related to this account. While the exposures at age 0 have increased from \$61 million in the previous study, in the current study they exceed \$100 million. Retirements through age 24.5 have nearly doubled, from \$17.4 million to \$35.6 million. Nearly every data point through to age 24.5 shows a lower surviving percentage in the current study as compared to the previous study.
E02	EMS EQUIPMENT	35-R2.5	30-S0.5	The historical retirement experience for this account is influenced by two large retirements, occurring at ages 8.5 and 9.5. As such, while Concentric has recommended a life shortening to place some weighting on the historical retirement experience, Concentric recommends not overreacting to the early retirement experience. The recommended life shortening of 5 years follows the practice of gradualism and moderation while not overreacting to the two retirement data points.	The current depreciation study shows considerably more retirements prior to the average age as compared to the previous depreciation study. The two large retirements at ages 8.9 and 9.5 have occurred since the previous study, as have additional retirements through the remainder of the life of the account. This increase in the retirement experience reinforces the need to reduce the average service life.
E03	ENVIRONMENTAL EQUIPMENT	45-R2.5	47-R3	The historical retirement information indicates that a life lengthening is necessary. However, this account has only recorded \$146,785 in historical retirements. As such, while Concentric agrees that a life lengthening is necessary at this time, Concentric has proposed a smaller step change than would be indicated by the historical data.	The additional 9 years of retirement data collected since the last depreciation study indicates a life longer than the currently approved 45 years.
G01	GAS TURBINE SYSTEMS	45-R3	40-R3	Conversations with Subject Matter Experts indicate that gas turbine lives should be approximately 40 years based on their experience. The total life is based on the number of starts of the system, with overhauls expected to live approximately 10 - 15 years. It is noted that the recommended 40-R3 is a superior fit to the historical data through approximately age 30, after which point there are only three years with retirement transactions recorded.	There has been an increase in the retirements through age 38.5 seen in this account. While the total exposures at age 0 have only increased by \$14m, the retirements before age 39 have increased by more than \$1.6 million, which represents an increase of almost 30%. Additionally, these retirements have occurred at a variety of ages.
G03	GENERATORS, WINDINGS, AND POWERHOUSE	65-S3	62-R2.5	This account combined Account G04 Generator - Windings with an Iowa 50-S3 and Account P10 Powerhouse with an Iowa 75-R3 with Account G03 Generators with an Iowa 65-S3. The combination of the three accounts, in addition to the trends in the life cycles of each account since the last study, has led to the need to slightly decrease the life at this time. Additionally, while there have been more than \$11 million in historical retirements, the exposures never fall below 92% surviving.	This account did not exist in it's current form in the previous depreciation study. As such, it is not possible to compare the retirement patterns in the current study with that of the previous study.
G07	GROUND WIRE SYSTEM	55-R4	60-R4	The recommended Iowa 60-R4 provides a better mathematical fit to the historical data, with a residual measure of 0.6299 as compared to the currently approved Iowa 55-R4 with a residual measure of 1.0701.	The total exposures related to this account at age 0 have tripled since the last depreciation study, however there has not been a corresponding increase in the retirements experienced, which have only increased by \$100 thousand. This increase in exposures has increased the percentage surviving at all age intervals over the life of this account, which results in indications of a longer average service life.
I02	INSTRUMENTATION	30-L0.5	25-L0.5	The historical data indicates that a life shortening is necessary, particularly from ages 9.5 through 29.5. While the mathematical fit for the entire historical range favours the currently approved life, the visual fit of the area of most important retirements shows a superior fit to the recommended 25-L0.5.	The retirements experience since the last depreciation study has shown indications of a life shortening as compared to the previous depreciation study. The percent surviving by age has reduced throughout most data points in this account.
I05	INVERTERS	25-S1.5	22-S1.5	The historical data indicates that a life shortening is necessary, particularly through age 24.5. While the mathematical fit for the entire historical range favours the currently approved life, the visual fit of the area of most important retirements shows a superior fit to the recommended 22-S1.5.	There has not been a significant change in the retirement patterns since the previous depreciation study.
M06	METERS - DIGITAL	20-L3	18-L3	The assets within this account relate to digital metering assets. The historical data include additions from 1965 through 2024 with retirements from 1991 through 2024. These assets have undergone a significant change in the expected life cycle due to the impact of technology in the time since the oldest additions were recorded. Additionally, Measurement Canada Standard S.S.06 mandates testing batches of electric meters at 10 years and again at 18 years with significant fines for utilities who do not pass testing. An 18 year life aligns with the end of the second testing period, which allows for meters to be replaced instead of undergoing a third test period.	Concentric did not place significant weighting on the historical retirement patterns when selecting the life and Iowa curve for this account.
M10	MISCELLANEOUS UNITS OF PROPERTY	22-R1.5	25-R1.5	The historical retirement experience indicates that a life lengthening is necessary at this time. The currently approved Iowa 22-R1.5 has a residual measure of 2.3709 while the recommended Iowa 25-R1.5 has a residual measure of 2.1118.	N/A
M11	MOBILE - A.T.V.'S AND SNOWMOBILES	6-L3	7-L3	The historical retirement experience indicates that a life lengthening is necessary at this time. The currently approved Iowa 6-L3 has a residual measure of 0.3341 while the recommended Iowa 7-L3 has a residual measure of 0.1131.	N/A
P03	PENSTOCK	70-R4	80-R5	There is currently ongoing refurbishment to extend the life of penstocks throughout the NLH system. Discussions with Subject Matter Experts indicate a life of 80 years to be appropriate.	The retirement experience since the last depreciation study has shown indications of a longer average service life. While the 35-S2.5 was a good fit to data in the previous study, the older retirement ages in the years since that time provide a superior fit to the 40-S2.5 in the current study.
P04	POLE CRIBS AND POLE HARDWARE	35-S2.5	40-S2.5	While many utilities account for these assets within the poles accounts, the peer with these assets broken out indicate a life of 45 years. Additionally, the historical data indicates that a life extension is necessary at this time. The currently approved Iowa 35-S2.5 has a residual measure of 2.8356 while the recommended Iowa 40-S2.5 has a residual measure of 2.1938.	The retirement experience since the last depreciation study have shown indications of a longer average service life. While the 43-R1 fit some data points prior to age 40 in the previous depreciation study, particularly around age 20, it does not align with these same data points in the current study.
P07	POLES - WOOD	43-R1	50-R1.5	Management meetings indicated that the average life on wood poles is trending above 50 years. Additionally, the mathematical fit to the historical data indicates a life lengthening may be necessary at this time. The currently approved Iowa 43-R1 has a residual measure of 0.888 while the recommended Iowa 50-R1.5 has a residual measure of 0.6017.	There has been a significant increase in the value of retirements since the previous depreciation study, from \$139 thousand to \$534 thousand. These retirements have occurred at a variety of ages and have provided better indications of the historical retirement patterns.
P09	POWER SYSTEMS	20-L3	25-L3	The historical data indicates that a life extension is necessary at this time. The currently approved Iowa 20-L3 has a residual measure of 1.7602 while the recommended Iowa 25-L3 has a residual measure of 1.0883.	This account did not exist in it's current form in the previous depreciation study. As such, it is not possible to compare the retirement patterns in the current study with that of the previous study.
R02	RADIOS - FIXED MICROWAVE EQUIPMENT AND FIXED UHF EQUIPMENT	19-R5	15-R5	This account combined Account R03 Radios - Fixed UHF Equipment with an Iowa 15-L0.5 with Account R02 with an Iowa 19-R5. Additionally, Subject Matter Experts indicated that a 15 year life is appropriate as these accounts are subject to changing technology, which drives a shorter life cycle.	This account did not exist in it's current form in the previous depreciation study. As such, it is not possible to compare the retirement patterns in the current study with that of the previous study.
R04	RADIOS - FIXED VHF EQUIPMENT AND MOBILE VHF BASE STATION	19-R3	15-R3	This account combined Account R05 Radios - Mobile VHF Base Station with an Iowa 15-R4 with Account R04 with an Iowa 19-R3. Additionally, Subject Matter Experts indicated that a 15 year life is appropriate as these accounts are subject to changing technology, which drives a shorter life cycle.	The retirement experience since the last depreciation study have shown indications of a shorter average service life. While the 40-S.5 was a good fit to data in the previous study, the younger retirement ages in the years since that time provide a superior fit to the 35-S0 in the current study. This is most easily seen in the value of retirements through age 30.5. The previous depreciation study included \$1.3 million in retirements through age 30.5, while the current study includes \$2.1 million, an increase of 63%.
R09	REGULATORS	40-S0.5	35-S0	The historical data indicates that a life shortening is necessary at this time, particularly through age 42.5. The currently approved Iowa 40-S0.5 has a residual measure of 0.4704 while the recommended Iowa 35-S0 has a residual measure of 0.4065.	

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Account	Account Description	Previous Study Survivor Curve	Recommended Survivor Curve	Explanation for Change in Average Service Life	Impact of Retirement History Since Last Study
S14	STREET LIGHTS	20-R2	25-R1.5	The historical data indicates that a life extension is necessary at this time. The currently approved Iowa 20-R2 has a residual measure of 2.4545 while the recommended Iowa 25-R1.5 has a residual measure of 1.7385.	While the Iowa 20-R2 continues to fit the historical retirement experience well through approximately age 15.5, the later data points are starting to show signs of an increase in the average age of retirement. There has been a shift in the retirement experience towards later average ages at retirements in the last 9 years, indicating that a life extension is warranted at this time.
T01	TELECONTROL SYSTEM	25-L1.5	27-S0.5	The historical data indicates that a life lengthening may be necessary at this time, particularly after age 20.5. The currently approved Iowa 25-L1.5 has a residual measure of 1.0778 while the recommended Iowa 27-S0.5 has a residual measure of 1.0468.	While the retirement experience has not changed significantly since the previous depreciation study, Concentric placed increased weighting on the period from age 18.5 through 30.5 as compared to the previous depreciation study. The retirements in this time frame are showing indications of slightly older average age at retirement, which aligns with the need to increase the average service life.
T05	TRANSFORMERS - OTHER, PAD MOUNT, AND STATIC EXCITATION SYSTEM AND TRANSFORMERS	55-R3	50-R2.5	Combined T06 - Transformers Pad Mount (40-R1.5), S08 Static Excitation System (32-R4), and S09 Static Excitation Transformers (45-R4). The inclusion of the shorter lived asset accounts requires a life shortening.	This account did not exist in its current form in the previous depreciation study. As such, it is not possible to compare the retirement patterns in the current study with that of the previous study.
T07	TRANSFORMERS - POLE MOUNTED	30-L1	35-L1	Conversations with subject matter experts indicated that a life extension is necessary based on their experience. Peer range is 50 - 63 years, which indicates a life extension is warranted at this time. Additionally, the historical data is supportive of a life extension with the currently approved Iowa 30-L1 providing a residual measure of 2.2212 while the recommended Iowa 35-L1 provides a residual measure of 1.6668.	The retirement experience since the last depreciation study have shown indications of a longer average service life. While the 30-L1 was a good fit to data in the previous study, the older retirement ages in the years since that time provide a superior fit to the 35-L1 in the current study.
T14	TRANSFORMERS - CHARGING STATION	New Account-	10-SQ	Based on peer review.	N/A
V05	VEHICLES - BOOMS/BODIES/CRANES/CAB/CHASSIS	12-L3	13-L3	The historical data indicates that a life extension is necessary at this time. The currently approved Iowa 12-L3 has a residual measure of 0.296 while the recommended Iowa 13-L3 has a residual measure of 0.164.	N/A
V06	VEHICLES - CARS, STATION WAGONS AND VAN	6-L3	7-L3	The historical data indicates that a life extension is necessary at this time. The currently approved Iowa 6-L3 has a residual measure of 0.2554 while the recommended Iowa 7-L3 has a residual measure of 0.169.	N/A