BEFORE THE

NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

DOCKET DG 21-104

IN THE MATTER OF: Northern Utilities, Inc.
Request for Change in Rates

DIRECT TESTIMONY

OF

Stephen R. Eckberg
Utility Analyst
New Hampshire Department of Energy

April 1, 2022

Q. Please state your full names.

A. Stephen R. Eckberg.

Q. By whom are you employed and what is your business address?

A. I am employed as a utility analyst with the New Hampshire Department of Energy in the Regulatory Support Division. My business address is 21 South Fruit Street, Suite 10, Concord, NH, 03301.

Q. Please summarize your relevant education and professional work experiences.

A. I was previously employed as a Utility Analyst with the New Hampshire Office of Consumer Advocate (OCA) from 2007 to 2014. In 2014, I joined the Sustainable Energy Division of the Public Utilities Commission (PUC). In 2019, I joined the Commission's Electric Division. In July, 2021, with the passage of HB2, the New Hampshire Legislature created the Department of Energy (DOE) and I became an employee of the Regulatory Support Division of DOE. I have a B.S. in Meteorology from the State University of New York at Oswego and an M.S. in Statistics from the University of Southern Maine. I have worked in a variety of energy related analytic and administrative roles for over 25 years. Attachment SRE-1 provides more complete details of my education and professional work experience.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present DOE's position on the Depreciation Study and recommendations from that Study by Northern Utilities, Inc. (Northern) witness Mr. Ned Allis.

Depreciation

Q. Please briefly describe your background in utility depreciation matters.

A: I am familiar with depreciation matters, having reviewed depreciation studies in numerous utility rate case dockets in which I have participated. I have taken the Fundamentals of Depreciation training course offered by the Society of Depreciation Professionals and am working toward becoming a Certified Depreciation Professional (CDP). I recently filed testimony addressing depreciation in DE 21-030, a rate case filed by Northern's regulated affiliate, Unitil Energy System (UES). In that case. DOE, UES and others submitted a comprehensive settlement for approval to the PUC which provides that UES will use depreciation rates developed using the whole life technique for regulatory depreciation of its capital assets.

Q: Please provide a summary of your recommendations regarding depreciation in this case.

A: My recommendations to the Commission include:

1) Approve the use of depreciation accrual rates developed using the whole life (WL) technique to determine the accrual rates and annual depreciation amount, by plant account, rather than rates developed using the remaining life (RL) technique as submitted in the Depreciation Study performed by Company witness, Mr. Ned Allis.
2) Direct the Company to perform future Depreciation Studies using the whole life technique in conformance with past Commission practice.

3) Approve $10,426,590 as the unadjusted whole life depreciation annual accrual amount for the test year based on pro-forma end of test year plant account balances.

4) Approve a ten year amortization of the theoretical reserve imbalance of ($18,518,579)[1] resulting in annual charge to ratepayers of $1,851,858. DOE recommends that the Theoretical Depreciation Reserve Imbalance be amortized over ten years consistent with the average time between two depreciation studies.

Q: What is the significance of depreciation in rate of return utility regulation and for purposes of this proceeding?

A: Northern, as with all regulated public utilities, includes in its annual revenue requirement an amount that is, at least theoretically, equal to the decline in the value of the company's capital assets over a twelve month period. This is necessary because all capital assets decline in value over their period of usage. To account for this, the annual amount of depreciation is deducted in the calculation of the utility's rate base and that same amount becomes an addition to its operating cost. In this manner, the utility's shareholders receive both a return *on* their investment through application of the authorized rate of return to the approved rate base, and, via the depreciation charges, the utility realizes a return *of* their investment.

The accounting necessary to determine the depreciation amount is complicated. Utilities, including Northern, constantly add new capital assets to their rate base, and accurate records must be kept about the asset additions, and related removals. In addition, operating conditions are not static, and existing assets may not depreciate exactly as they were

[1] The negative imbalance is calculated as (Book Depreciation Reserve – Theoretical Accrued Depreciation) so that a negative value indicates an undercollection of depreciation amounts from ratepayers.

expected to at the time they were installed and included in rate base. For this reason, utilities such as Northern, conduct, from time to time, depreciation studies, usually completed by experienced consultants who are expert in the field of depreciation. A depreciation study is a statistical undertaking that takes into account the vintage of the utility's assets – the year when each asset was placed in service and the rate at which specific assets are being retired from service. Actuarial techniques are used to update determinations of how much useful life remains, on average, in the capital assets included in rate base. Depreciation experts use statistical techniques to fit survival curves to groups of assets and make calculations of how the forces of retirement are acting upon each asset group to derive an estimate of the service life remaining in each such group.

Q: Have you reviewed the depreciation study and recommendations that UES' witness, Mr. Allis, has presented?

A: Yes, I have.

Q: What did the depreciation study performed by Mr. Allis present?

A: Mr. Allis' study, which used the straight-line method, average service life broad group procedure, and RL technique, presented newly developed depreciation accrual rates for most of the common production, distribution, and general plant accounts used to record the company's distribution assets. As Mr. Allis states on Bates 1183 at lines 11-17 of his testimony, while both the existing rates and the proposed rates determined in the depreciation study he proposes in this docket, are based on the average service life procedure, the proposed rates were developed using the RL technique, while the existing rates are based on

the WL technique. Mr. Allis clearly explains that the use of the RL technique is a change from the previous depreciation study for the Company, in which the WL technique was used.

Q: Have you looked at the depreciation methods and techniques proposed in Northern recent rates? What did you learn?

A: I reviewed Northern's three prior rate cases: DG 11-069, DG 13-086, and DG 17-070. In DG 11-069 and DG 17-070, Northern performed depreciation studies using the WL technique, Northern did not present a depreciation study in DG 13-086 and used the WL rates from DG 11-069.

Q: You mentioned that Mr. Allis used the RL technique in his study in this case, representing a change from the prior study. Do you support that change in technique?

A: No. I recommend that the Company continue to use depreciation accrual rates developed using the WL technique. The use of the WL depreciation technique is consistent with the Commission's practice for setting depreciation accrual rates for other gas companies as well as for electric and water utilities. See Attachment SRE-2 for a list of PUC Orders relating to the use of the whole life technique. As stated above, the whole life depreciation technique is the basis for the Commission approved depreciation accrual rates that are currently in place for Northern.

Q: Can you briefly explain the difference between the whole life and the remaining life techniques?

A: The whole life technique allocates the original cost of the assets less the estimated net salvage[2] over the total estimated life of the asset. The whole life formula is defined as follows:

WL Depreciation Accrual Rate = (1 – Net Salvage Rate) / (Average Service Life)

For example, if a capital asset has an average service life of 10 years and a net salvage rate of 20 percent, the WL accrual rate would be calculated as follows:

WL rate = (1 – 0.20) / 10 = (0.8)/10 = 0.08 = 8% annual accrual rate

This accrual rate would result in collecting 80% of the original asset value over the 10 year depreciable life of the asset with the remaining 20% of the asset's original cost realized through its salvage value.

The remaining life technique takes a different approach. It recovers the undepreciated original cost less the net salvage over the remaining life of the asset. That is, the original plant cost less current book depreciation is used as the depreciable cost and the average remaining life is used in the denominator to calculate the annual depreciation accrual rate. The formulas for both the remaining life depreciation amount and the corresponding rate are more complicated than the whole life formulas and I will not attempt to provide them here. Additional detail on the remaining life formulas is provided in Attachment SRE-3[3].

[2] Net salvage represents the estimated gross salvage value less the estimated cost of removal at retirement. Net salvage can be either positive (if gross salvage > cost of removal) or negative (if cost of removal > gross salvage).
[3] Information provided in Attachment SRE-3 is from the NARUC manual titled "Public Utility Depreciation Practices" August 1996.

Q: Are there advantages and disadvantages of each whole life and remaining life techniques?

A: Yes, there are. The whole life technique is simpler to explain and to present mathematically. However, because the whole life approach uses the original cost of the asset to calculate the accrual rate even as new information comes in over the life of the asset about changes in the net salvage rates and the asset life itself (an asset may prove to deteriorate more quickly or last longer than originally planned), there can be differences which develop between the booked depreciation reserve (the total amount of depreciation expense collected from ratepayers) and the theoretical or calculated depreciation amount. This difference is referred to as a theoretical reserve imbalance.

Q: Please explain what a theoretical reserve imbalance represents.

A: A utility's theoretical depreciation reserve is the calculated balance that would be in the company's accumulated depreciation account at a point in time using the currently approved, or proposed, depreciation parameters. A utility's booked depreciation reserve, alternately called accumulated depreciation, is equal to the total amount of depreciation expense (collected from ratepayers) relative to all of the utility's capital assets as stated on the utility's balance sheet. A depreciation reserve imbalance occurs when there is a difference between the depreciation reserve recorded on the company's balance sheet (book reserve) and the calculated value of the accumulated depreciation (theoretical reserve). This imbalance could indicate that ratepayers should have paid more, or less, than they actually have at a point in time.

Q: Please continue with your explanation of the advantages and disadvantages of the whole life and remaining life techniques.

A. As I explained above, use of the whole life technique may result in a theoretical reserve imbalance. That imbalance is then something which may require attention if it is large enough – either positive or negative. The remaining life technique differs in that it uses the undepreciated value of the asset and the remaining service life to calculate the annual accrual rate. This method incorporates into the accrual rate calculation any theoretical reserve imbalance and spreads it out over the remaining life of the asset. It's important to note that the remaining life method starts with the undepreciated value of the assets – this is the original cost less the book reserve which means that this method already incorporates any potential reserve imbalance into its calculations. This method has some advantage in that, theoretically, it will always collect no more and no less than the original cost of the plant asset over the life of that asset, even as new information comes in over time about retirements, service life, and salvage value during subsequent depreciation studies.

Q: Does Mr. Allis also explain and compare the whole life and remaining life techniques?

A: Yes. On Bates 1183 – 1185 of his testimony, Mr. Allis provides a comparison of these two techniques and explains why he believes the remaining life method is superior.

Q: Can you provide a synopsis of why Mr. Allis believes the remaining life depreciation technique to be superior?

A: My understanding is that because the remaining life technique corrects for issues that arise when average service lives change over time and adjusts the accrual rate to compensate for

prior over- or under-collection of depreciation amounts without the need for external amortization of any theoretical reserve imbalance, Mr. Allis finds the remaining life technique to be superior to the whole life technique.

Q: Did Mr. Allis' depreciation study determine that there was a theoretical reserve imbalance that would need to be dealt with?

A: No. As explained, the depreciation study prepared by Mr. Allis used the remaining life technique, so any imbalance has been incorporated into his calculated depreciation accrual rates and any imbalance is spread over the average remaining life of the assets in each plant account.

Q: However, in your recommendations at the beginning of your testimony, you stated that there is a reserve imbalance and you recommended a period over which it should be amortized. What is the source of the calculation of the reserve imbalance?

A: In response to discovery, Mr. Allis performed additional calculations using the whole life technique to determine a total annual depreciation accrual amount and a theoretical reserve imbalance. The response to data request Energy 4-36 and its attachments are included as Attachment SRE-4 and are the source of information used in my recommendation.

Q: Does the theoretical reserve calculated by Mr. Allis in response to data request Energy 4-36 represent the "correct" reserve amount?

A: Not precisely. The theoretical reserve is an estimate developed at a point in time based on the current plant balances, the current life and net salvage estimates developed using

available plant records. It provides a useful measurement which can be compared to the Company's actual book reserve to establish the relative position of the two estimates. It should not generally be considered as the "correct" reserve amount. This is, in part, because development of the theoretical reserve value depends on decisions and judgement made during the study of "best fit" Iowa Curves (asset survival curves) among other things. These decisions are, to a degree, subjective and experts will not always agree on every particular element of a study. For example, there may be several different Iowa curves which each fit plant data reasonably well but which yield slightly different results for average service life for assets in a plant account. Therefore, determination of accrual rates and depreciation accrual amounts are not an exact science – they are the result of the application of mathematical techniques, the results of which are based, in part, on the decisions of the expert conducting the study.

Q: Can the reserve imbalance change from one depreciation study to the next?

A: Yes. As more, and newer, information becomes available about plant retirements, net salvage amounts, and changing plant technologies which impact service life, the depreciation accrual rates for various accounts will likely change from one study to the next. These changes will, in turn, impact the calculation of the theoretical reserve.

Q: What is the annual depreciation accrual amount recommended by Mr. Allis in his study compared to the amount he calculated in response to DOE's data requests?

A: The amounts are shown below in Table 1. These amounts are the basis for my recommendations regarding depreciation techniques, total annual depreciation amount, and

amortization of theoretical reserve imbalance. It should be noted that any changes to plant in service as a result of recommendations by other witnesses would impact the total annual depreciation accrual amount.

Table 1. Comparison of Allis Depreciation Calculation Using Remaining Life and Energy Recommended Whole Life Technique for Pro Forma Test Year.		
	Remaining Life	Whole Life
Depreciation Amount	$11,193,573	$10,426,590
Theoretical Reserve Imbalance	Not applicable	($18,518,579)
Amortization of Reserve Imbalance over 10 years results in additional annual cost to ratepayers	Not applicable	$1,851,858
Sources: Response to Energy 4-36 and TS 1-12, which are provided as Attachment SRE-4 and SRE-5, respectively.		

Q: Does this conclude your testimony?

A: Yes.

Qualifications of Stephen R. Eckberg

My name is Stephen R. Eckberg. I am employed as a Utility Analyst with the Regulatory Support Division of the New Hampshire Department of Energy. My business address is 21 S. Fruit Street, Suite 10, Concord, New Hampshire 03301.

I earned a B.S. in Meteorology from the State University of New York at Oswego and an M.S. in Statistics from the University of Southern Maine.

After receiving my M.S. degree, I was employed as an analyst in the Boston office of Hagler Bailly, Inc, a consulting firm working with regulated utilities to perform evaluations of energy efficiency and demand-side management programs. From 2000 through 2003, I was employed at the NH Governor's Office of Energy and Community Services as the Director of the Weatherization Assistance Program. Following that, I was employed at Belknap Merrimack Community Action Agency as the Statewide Program Administrator of the NH Electric Assistance Program (EAP). In that capacity, I presented testimony before the NH Public Utilities Commission (PUC) in dockets related to the design, implementation and management of the EAP. I have also testified before Committees of the New Hampshire General Court on issues related to energy efficiency and low income electric bill assistance. From 2007 – 2014 I was employed as a Utility Analyst with the New Hampshire Office of the Consumer Advocate (OCA). During my tenure with the OCA, I attended rate making and regulatory training at New Mexico State University's Center for Public Utilities.

In my position with the OCA, I entered pre-filed testimony jointly with Kenneth E. Traum, former Assistant Consumer Advocate, in the following dockets:

- DG 08-048 Unitil Corporation and Northem Utilities, Inc. Joint Petition for Approval of Stock Acquisition
- DW 08-070 Lakes Region Water Company Financing & Step Increase

- DW 08-098 Aquarion Water Company of New Hampshire
- DE 09-035 Public Service of New Hampshire Distribution Service Rate Case

I entered (non-joint) pre-filed testimony in the following dockets:

- DT 07-027 Kearsarge Telephone Company, Wilton Telephone Company, Hollis Telephone Company & Merrimack County Telephone Company Petition for Alternative Form of Regulation. Phase II & Phase III.
- DW 08-073 Pennichuck Water Works, Inc. Petition for Rate Increase
- DW 08-070 Lakes Region Water Company Third Step Increase.
- DW 08-065 Hampstead Area Water Company Petition for Rate Increase.
- DE 09-170 2010 CORE Energy Efficiency Programs.
- DW 10-090 Pittsfield Aqueduct Company Petition for Rate Increase.
- DW 10-091 Pennichuck Water Works Petition for Rate Increase.
- DW 10-141 Lakes Region Water Petition for Rate Increase.
- DE 10-188 2011-2012 CORE and Natural Gas Energy Efficiency Programs.
- DE 11-250 PSNH Installation of a Wet Flue-Gas Desulphurization Scrubber.
- DE 12-262 2013-2014 CORE and Natural Gas Energy Efficiency Programs.
- DE 12-292 PSNH 2013 Default Energy Service Rate.
- DE 12-262 2014 CORE Energy Efficiency Programs Update Filing.
- DE 13-108 PSNH 2012 Energy Service Reconciliation.
- DG 14-091 Liberty Utilities Special Contract and Lease Agreement with Innovative Natural Gas, LLC dba iNATGAS.

In August 2014, I joined the PUC's Sustainable Energy Division (SED). My responsibilities included grant review and administration, and compliance oversight of New Hampshire's Renewable Portfolio Standard requirements. While employed with SED, I filed testimony in:

- DE 18-140 Liberty Utilities Petition for Approval of a Renewable Natural Gas Supply and Transportation Contract

In October 2019, I joined the PUC's Electric Division. I have filed testimony in:

- DE 17-136 2018-2020 New Hampshire Statewide Energy Efficiency Plan - 2020 Third Year Programs.

- DE 19-197 Development of a Statewide, Multi-Use Online Energy Data Platform (Joint Testimony with Jason Morse).

- DE 20-092 2021 – 2023 Triennial Energy Efficiency Plan.

- DE 21-040 Unitil Energy Systems, Inc. Request for Change in Rates.

In July 2021, with the passage of HB2, the New Hampshire Legislature created the Department of Energy, I became an employee of the Regulatory Support Division of the Department of Energy.

A list of NH PUC cases where the whole life depreciation method was adopted.

1. Order No. 22,141 (May 13, 1996)(GSEC)(stating "GSEC agrees to maintain its current **whole life** depreciation methodology and to submit a new depreciation study with its next rate case filing")
2. Order No. 22,883 (March 25, 1998)(PWW)(stating "Finally, regarding depreciation, Pennichuck and Staff agree to use the '**whole life**' rather than Pennichuck's proposed 'average remaining life' methodology, for an annual depreciation expense of $1,272,791, which results in an annual composite depreciation rate of 2.44%.")
3. Order No. 24,072 (October 25, 2002)(Concord Electric Co.)(stating "Under section 3.6, UES agrees to file a general base rate case and an updated depreciation study using the **whole life** methodology no later than five years from the issuance of the Commission's final order.")
4. Order No. 24,075 (October 28, 2002)(Northern)(Stating "Staff and the Parties agreed to use of the Broad Group/**Whole Life** depreciation rates with the applicable plant in service balance as of June 30, 2001 plus the annual amortization of the depreciation reserve imbalance over five years to determine the required level of depreciation expense.")
5. Order No. 24,369 (September 2, 2004)(PSNH)(stating "The signatories agreed to adopt Staff's recommendations, both as to the annual deduction from rate base to reflect the declining value of assets over time and as to the corresponding addition to PSNH's annual operating costs as depreciation expenses. Staff recommended that depreciation accrual rates be applied to plant balances as of June 30, 2003. It was Staff's further recommendation to use the **whole life** technique, as opposed to PSNH's proposed use of the remaining life technique, to determine estimated depreciation expense.")
6. Order No. 25,123 (June 28, 2010)(PSNH)(stating "The settlement agreement also notes that the rate increases allowed under the settlement agreement were calculated using Commission-approved **whole-life** depreciation rates, and that the Company should continue to record its depreciation expense using the **whole-life** rates testified to by Staff witness Cunningham.")
7. Order No. 25,352 (April 24, 2012)(Northern)(stating "Pursuant to Section 4.1 of the Settlement Agreement, the Company will use **whole-life** depreciation accrual rates, as presented in supporting schedules and explained in Mr. Cunningham's testimony.")
8. Order No. 26,129 (May 2, 2018)(Northern)(Stating "The Settling Parties agreed that Northern would reflect updated **whole-life** rates for book depreciation purposes (as shown on Exhibit 7 at 315) and that there would be no amortization of the reserve variance. *Id.* at ¶ 3.2."
9. Order No. 26,433 (December 15, 2020)(PSNH)(stating "Section 7 addresses certain cost of service adjustments, including the use of **whole-life** depreciation and the treatment of an accrual for uncollectible expense.")

mortality data were accumulated. The prediction of future retirement patterns is also necessary in application of the vintage group procedure. However, ELG is much more sensitive to these predictions. ELG may be expected to produce greater fluctuations in depreciation expense from year to year than the broad group procedure.

The Broad Group procedure does not require that an assumption be made concerning the shape of the appropriate survivor curve (see Chapter VI) in the grouping process. However, Vintage Group, as generally applied, and ELG require such a determination. ELG depends upon the survivor curve forecast to determine the subgroups. With the FCC's agreement, the ELG procedure has been widely adopted by telephone companies subject to FCC jurisdiction. Some of the state commissions, however, have disallowed its use for intrastate rate making on both practical and technical grounds. The Vintage Group and Equal Life Group procedures are discussed in more detail in Chapter XII.

Application Techniques

There are two techniques commonly used to determine the depreciation rate to be applied to a utility's plant depreciation categories: Whole Life and Remaining Life.

Whole Life

The Whole Life technique bases the depreciation rate on the estimated average service life of the plant category. Whole life depreciation results in the allocation of a gross plant base over the total life of the investment. However, to the extent that the estimated average service life assigned turns out to be incorrect, (and precision in these estimates cannot reasonably be expected), the Whole Life technique will result in a depreciation reserve imbalance. For example, such over-accrual or under-accrual may remain in the reserve indefinitely unless offset by later overages or underages in the opposite direction. However, when a depreciation reserve excess or deficiency is reasonably certain, the Whole Life technique may be modified to include an adjustment to the accrual rate designed to eliminate the reserve imbalance in the future. For example, a special amortization of the difference may be allowed.

Remaining Life

The Remaining Life technique seeks to recover the undepreciated original cost less future net salvage over its remaining life. With this technique, the gross plant less book depreciation reserve is used as the depreciable cost and the remaining life or future life expectancy is used in the denominator. The formula is:

$$D = \frac{B - U - C'}{E} \quad (11)$$

where D is the depreciation expense or annual accrual
where B is the book cost of the Gross Plant
where U is the book depreciation reserve at start of the year
where C'is the Estimated Future Net Salvage in dollars
where E is the Estimated Average Remaining Life

The following formula is used to arrive at the depreciation rate in percent:

$$\text{depreciation rate } d = \frac{D}{B} \times 100 \quad (12)$$

This rate may also be derived by dealing entirely in percentages as follows:

$$\text{depreciation rate } d = \frac{100 - u - c'}{E} \quad (13)$$

Northern Utilities, Inc.
Docket No. DG 21-104
Department of Energy Data Requests – Set 4

Date Request Received: 12/6/21 Date of Response: 12/20/21
Request No. Energy 4-36 Witness: Ned W. Allis

REQUEST:

Depreciation. Reference Schedule RevReq-3-16, Bates 158.

a. Please provide a schedule comparing Whole Life and Remaining Life methodologies.
b. Please provide a revised Schedule RevReq 3-16 using Whole Life.
c. Please provide the resultant theoretical reserve imbalance assuming Whole Life.

RESPONSE:

a. Please see Energy 4-36 Attachment 1 (in Excel format) to this response for a schedule showing the whole life depreciation rates using the depreciation parameters recommended in the depreciation study as well as a comparison of the resulting depreciation rates and accruals using the remaining life and whole life techniques.

b. Please see Energy 4-36 Attachment 2 (in Excel format) to this response for a revised Schedule RevReq 3-16 using the whole life technique. The revised Schedule RevReq 3-16 does not reflect the amortization of the theoretical reserve imbalance that would be necessary if the whole life technique is used.

c. Please see Energy 4-36 Attachment 1 to this response for a schedule showing the theoretical reserve imbalance for each account. The Company's proposal is to use the remaining life technique, which effectively recovers the theoretical reserve imbalance over the remaining life for each account, except for general plant amortization accounts. For general plant amortization accounts the Company's proposal is to address the reserves for these accounts over 5 years.

NORTHERN UTILITIES, INC.
NEW HAMPSHIRE DIVISION

SUMMARY OF ESTIMATED SURVIVOR CURVE, NET SALVAGE PERCENT, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO GAS PLANT AS OF DECEMBER 31, 2020
BASED ON THE WHOLE LIFE TECHNIQUE

	DEPRECIABLE GROUP	SURVIVOR CURVE	NET SALVAGE PERCENT	ORIGINAL COST AS OF DECEMBER 31, 2020	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	CALCULATED ACCRUED DEPRECIATION
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	GAS PLANT						
	DISTRIBUTION PLANT						
375.00	STRUCTURES AND IMPROVEMENTS	55-R2.5	(10)	3,260,871.26	65,283	2.00	1,291,250
	MAINS						
376.20	COATED AND WRAPPED	55-R2.5	(60)	29,746,227.02	866,210	2.91	11,688,236
376.40	PLASTIC	55-R2.5	(60)	120,342,184.10	3,504,364	2.91	34,937,879
376.60	CATHODIC PROTECTION	30-S5	(60)	1,082,739.45	57,688	5.33	612,441
	TOTAL MAINS			151,171,150.57	4,428,262	2.93	47,238,556
378.20	MEASURING AND REGULATING STATION EQUIPMENT	30-R2	(20)	7,328,248.14	292,753	3.99	1,543,304
380.00	SERVICES	45-R2.5	(90)	82,837,046.71	3,494,067	4.22	32,473,287
381.00	METERS	30-R2	(15)	4,624,610.24	177,099	3.83	1,856,724
382.00	METER INSTALLATIONS	30-R3	(10)	26,001,685.36	952,442	3.66	8,709,961
383.00	HOUSE REGULATORS	30-R3	0	733,549.58	24,427	3.33	211,178
386.00	OTHER PROPERTY ON CUSTOMERS' PREMISES	12-R2	0	1,978,895.03	135,356	6.84	1,150,464
	TOTAL DISTRIBUTION PLANT			**277,936,056.89**	**9,569,689**	**3.44**	**94,474,724**
	GENERAL PLANT						
391.10	OFFICE FURNITURE AND EQUIPMENT	15-SQ	0	508,134.77	33,893	6.67	279,943
394.10	TOOLS, SHOP AND GARAGE EQUIPMENT						
	FULLY ACCRUED			115,969.89	0	-	115,969
	AMORTIZED	25-SQ	0	1,314,451.52	52,578	4.00	537,121
	TOTAL TOOLS, SHOP AND GARAGE EQUIPMENT			1,430,421.41	52,578	3.68	653,090
397.00	COMMUNICATION EQUIPMENT						
	FULLY ACCRUED			368,887.11	0	-	368,888
	AMORTIZED	15-SQ	0	1,504,593.10	100,356	6.67	802,422
	TOTAL COMMUNICATION EQUIPMENT			1,873,480.21	100,356	5.36	1,171,310
397.35	COMMUNICATION EQUIPMENT - ERTs						
	FULLY ACCRUED			1,814,148.86	0	-	1,814,149
	AMORTIZED	15-SQ	0	1,655,997.32	110,455	6.67	773,241
	TOTAL COMMUNICATION EQUIPMENT - ERTs			3,470,146.18	110,455	3.18	2,587,390
	TOTAL GENERAL PLANT			**7,282,182.57**	**297,282**	**4.08**	**4,691,733**

NORTHERN UTILITIES, INC.
NEW HAMPSHIRE DIVISION

SUMMARY OF ESTIMATED SURVIVOR CURVE, NET SALVAGE PERCENT, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO GAS PLANT AS OF DECEMBER 31, 2020
BASED ON THE WHOLE LIFE TECHNIQUE

	DEPRECIABLE GROUP	SURVIVOR CURVE	NET SALVAGE PERCENT	ORIGINAL COST AS OF DECEMBER 31, 2020	CALCULATED ANNUAL ACCRUAL AMOUNT		CALCULATED ACCRUED RATE	DEPRECIATION
	(1)	(2)	(3)	(4)	(5)		(6)	(7)
	LEAK PRONE PIPE							
376.30	MAINS - BARE STEEL			190,836.93	464,724	*		
376.50	MAINS - JOINT SEALS			542,145.01	0	*		
376.80	MAINS - CAST IRON			28,455.49	243,173	*		
	TOTAL LEAK PRONE PIPE			**761,437.43**	**707,897**			
	TOTAL UNRECOVERED RESERVE TO BE AMORTIZED				**(145,798)**			
	TOTAL DEPRECIABLE PLANT			**285,979,676.89**	**10,429,070**		**3.65**	**99,166,457**
	NONDEPRECIABLE PLANT AND ACCOUNTS NOT STUDIED							
303.02	INTANGIBLE SOFTWARE - 10 YEARS			2,064,603.93				
303.30	INTANGIBLE PLANT - MISCELLANEOUS SOFTWARE			5,176,113.26				
304.20	LAND RIGHTS			6,816.33				
374.40	LAND RIGHTS			89,111.32				
374.50	RIGHTS OF WAY			17,910.67				
389.10	LAND			232,946.85				
393.00	STORES EQUIPMENT			31,519.95				
396.00	POWER OPERATED EQUIPMENT			75,266.49				
397.25	COMMUNICATION EQUIPMENT - METSCAN			112,656.43				
	TOTAL NONDEPRECIABLE PLANT AND ACCOUNTS NOT STUDIED			**7,806,945.23**				
	TOTAL GAS PLANT			**293,786,622.12**				

* FIVE-YEAR AMORTIZATION OF UNRECOVERED LEAK PRONE PIPE COSTS.
** FIVE-YEAR AMORTIZATION OF UNRECOVERED RESERVE RELATED TO IMPLEMENTATION OF AMORTIZATION ACCOUNTING.

NORTHERN UTILITIES, INC.
NEW HAMPSHIRE DIVISION

COMPARISON OF WHOLE LIFE AND REMAINING LIFE DEPRECIATION RATES AND ACCRUALS AS OF DECEMBER 31, 2020

			REMAINING LIFE (PROPOSED)				WHOLE LIFE				
	DEPRECIABLE GROUP	ORIGINAL COST AS OF DECEMBER 31, 2020	SURVIVOR CURVE	NET SALVAGE PERCENT	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	SURVIVOR CURVE	NET SALVAGE PERCENT	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	ACCRUAL DIFFERENCE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)=(9)-(5)
	DISTRIBUTION PLANT										
375.00	STRUCTURES AND IMPROVEMENTS	3,260,871.26	55-R2.5	(10)	89,338	2.74	55-R2.5	(10)	65,283	2.00	(24,055)
	MAINS										
376.20	COATED AND WRAPPED	29,746,227.02	55-R2.5	(60)	1,123,107	3.78	55-R2.5	(60)	866,210	2.91	(256,897)
376.40	PLASTIC	120,342,184.10	55-R2.5	(60)	3,460,577	2.88	55-R2.5	(60)	3,504,364	2.91	43,787
376.60	CATHODIC PROTECTION	1,082,739.45	30-S5	(60)	50,271	4.64	30-S5	(60)	57,688	5.33	7,417
	TOTAL MAINS	151,171,150.57			4,633,955	3.07			4,428,262	3.75	(205,693)
378.20	MEASURING AND REGULATING STATION EQUIPMENT	7,328,248.14	30-R2	(20)	356,985	4.87	30-R2	(20)	292,753	3.99	(64,232)
380.00	SERVICES	82,837,046.71	45-R2.5	(90)	3,654,478	4.41	45-R2.5	(90)	3,494,067	4.22	(160,411)
381.00	METERS	4,624,610.24	30-R2	(15)	247,087	5.34	30-R2	(15)	177,099	3.83	(69,988)
382.00	METER INSTALLATIONS	26,001,685.36	30-R3	(10)	1,098,766	4.23	30-R3	(10)	952,442	3.66	(146,324)
383.00	HOUSE REGULATORS	733,549.58	30-R3	0	24,378	3.32	30-R3	0	24,427	3.33	49
386.00	OTHER PROPERTY ON CUSTOMERS' PREMISES	1,978,895.03	12-R2	0	224,826	11.36	12-R2	0	135,356	6.84	(89,470)
	TOTAL DISTRIBUTION PLANT	**277,936,056.89**			**10,329,813**	**3.72**			**9,569,689**	**3.44**	**(760,124)**
	GENERAL PLANT										
391.10	OFFICE FURNITURE AND EQUIPMENT	508,134.77	15-SQ	0	33,877	6.67	15-SQ	0	33,893	6.67	16
394.10	TOOLS, SHOP AND GARAGE EQUIPMENT										
	FULLY ACCRUED	115,969.89			0	-			0	-	0
	AMORTIZED	1,314,451.52	25-SQ	0	52,539	4.00	25-SQ	0	52,578	4.00	39
	TOTAL TOOLS, SHOP AND GARAGE EQUIPMENT	1,430,421.41			52,539	3.67			52,578	3.68	39
397.00	COMMUNICATION EQUIPMENT										
	FULLY ACCRUED	368,887.11			0	-			0	-	0
	AMORTIZED	1,504,593.10	15-SQ	0	100,381	6.67	15-SQ	0	100,356	6.67	(25)
	TOTAL COMMUNICATION EQUIPMENT	1,873,480.21			100,381	5.36			100,356	5.36	(25)
397.35	COMMUNICATION EQUIPMENT - ERTs										
	FULLY ACCRUED	1,814,148.86			0	-			0	-	0
	AMORTIZED	1,655,997.32	15-SQ	0	110,435	6.67	15-SQ	0	110,455	6.67	20
	TOTAL COMMUNICATION EQUIPMENT - ERTs	3,470,146.18			110,435	3.18			110,455	3.18	20
	TOTAL GENERAL PLANT	**7,282,182.57**			**297,232**	**4.08**			**297,282**	**4.08**	**50**
	LEAK PRONE PIPE										
376.30	MAINS - BARE STEEL	190,836.93			464,724 *				464,724 *		0
376.50	MAINS - JOINT SEALS	542,145.01			0 *				0 *		0
376.80	MAINS - CAST IRON	28,455.49			243,173 *				243,173 *		0
	TOTAL LEAK PRONE PIPE	**761,437.43**			**707,897**				**707,897**		**0**
	RESERVE ADJUSTMENT FOR AMORTIZATION				**(147,312)**				**(145,798)**		**1,515**
	TOTAL DEPRECIABLE PLANT	**285,979,676.89**			**11,187,630**	**3.91**			**10,429,070**	**3.65**	**(758,559)**

* FIVE-YEAR AMORTIZATION OF UNRECOVERED LEAK PRONE PIPE COSTS.
** FIVE-YEAR AMORTIZATION OF UNRECOVERED RESERVE RELATED TO IMPLEMENTATION OF AMORTIZATION ACCOUNTING.

NORTHERN UTILITIES, INC.
NEW HAMPSHIRE DIVISION

COMPARISON OF THE CALCULATED ACCRUED DEPRECIATION AND BOOK DEPRECIATION RESERVE
AS OF DECEMBER 31, 2020

	DEPRECIABLE GROUP	CALCULATED ACCRUED DEPRECIATION	BOOK DEPRECIATION RESERVE		RESERVE IMBALANCE
	(1)	(2)	(3)		(4)=(3)-(2)
	GAS PLANT				
	DISTRIBUTION PLANT				
375.00	STRUCTURES AND IMPROVEMENTS	1,291,250	0		(1,291,250)
	MAINS				
376.20	COATED AND WRAPPED	11,688,236	4,224,164		(7,464,072)
376.40	PLASTIC	34,937,879	36,382,883		1,445,004
376.60	CATHODIC PROTECTION	612,441	682,660		70,219
	TOTAL MAINS	47,238,556	41,289,708		(5,948,848)
378.20	MEASURING AND REGULATING STATION EQUIPMENT	1,543,304	666,376		(876,928)
380.00	SERVICES	32,473,287	28,479,497		(3,993,790)
381.00	METERS	1,856,724	1,226,613		(630,111)
382.00	METER INSTALLATIONS	8,709,961	6,859,297		(1,850,664)
383.00	HOUSE REGULATORS	211,178	212,401		1,223
386.00	OTHER PROPERTY ON CUSTOMERS' PREMISES	1,150,464	0		(1,150,464)
	TOTAL DISTRIBUTION PLANT	**94,474,724**	**78,733,892**		**(15,740,832)**
	LEAK PRONE PIPE				
376.30	MAINS - BARE STEEL		(2,132,784)	*	(2,132,784)
376.50	MAINS - JOINT SEALS		542,145	*	542,145
376.80	MAINS - CAST IRON		(1,187,409)	*	(1,187,409)
	TOTAL LEAK PRONE PIPE	**0**	**(2,778,047)**		**(2,778,047)**
	TOTAL DEPRECIABLE PLANT	**94,474,724**	**75,955,845**		**(18,518,879)**
	AMORTIZED PLANT				
391.10	OFFICE FURNITURE AND EQUIPMENT	279,943	298,078	**	18,135
394.10	TOOLS, SHOP AND GARAGE EQUIPMENT	653,090	785,741	**	132,651
397.00	COMMUNICATION EQUIPMENT	1,171,310	1,570,602	**	399,292
397.35	COMMUNICATION EQUIPMENT - ERTs	2,587,390	2,766,299	**	178,909
	TOTAL AMORTIZED PLANT	**4,691,733**	**5,420,721**		**728,988**

* FIVE-YEAR AMORTIZATION OF UNRECOVERED LEAK PRONE PIPE COSTS.
** FIVE-YEAR AMORTIZATION OF UNRECOVERED RESERVE RELATED TO IMPLEMENTATION OF AMORTIZATION ACCOUNTING.

NORTHERN UTILITIES, INC. - NEW HAMPSHIRE
DEPRECIATION ANNUALIZATION USING WHOLE LIFE METHODOLOGY
12 MONTHS ENDED DECEMBER 31, 2020

Docket No. DG 21-104
Energy 4-36 Attachment 2
Page 1 of 1

LINE NO.	DESCRIPTION	(1)	(2) PLANT BALANCE 12/31/2020	(3) WHOLE LIFE DEPRECIATION RATES [1]	(4) PROFORMED DEPRECIATION EXPENSE
1	Amortizable Plant:				
2	303 Misc Intangible Plant		$ 12,826,347	N/A	N/A
3	Total Amortizable Plant		12,826,347	N/A	-
4	Mfg. Gas Produc. Plant:				
5	304.2 Land & Rights - Mfg Gas Prod. Pl		6,816	N/A	N/A
6	305 Struct. And Improvements		-	N/A	N/A
7	320 Other Equipment		-	N/A	N/A
8	321 LNG Equipment		-	N/A	N/A
9	Total Mfg Gas Prod. Plant		6,816	N/A	-
10	Distribution Plant:				
11	374.4 Land Rgts, Other Distr Sy		89,111	N/A	N/A
12	374.5 Land Rgts, Rights Of Way		17,911	N/A	N/A
13	375.2 Structures - City Gate Meas & Reg		43,350	2.00%	867
14	375.7 Structures - Other Dist Sys		3,217,521	2.00%	64,350
15	376.2 Mains - Coated/Wrapped		29,746,227	2.91%	865,615
16	376.3 Mains - Bare Steel		190,837	N/A	N/A
17	376.4 Mains - Plastic		120,342,184	2.91%	3,501,958
18	376.5 Mains - Joint Seals		542,145	N/A	N/A
19	376.6 Mains - Cathodic Protection		1,082,739	5.33%	57,710
20	376.8 Mains - Cast Iron		28,455	N/A	N/A
21	378.2 Mea & Reg Station Eq, Regulating		7,288,982	3.99%	290,830
22	379 Mea & Reg Ta-G		39,266	3.99%	1,567
23	380 Services		82,837,047	4.22%	3,495,723
24	381 Meters		4,624,610	3.83%	177,123
25	382 Meter Installations		26,001,685	3.66%	951,662
26	383 House Regulators		733,550	3.33%	24,427
27	386 Water Heaters/Conversion Burners		1,978,895	6.84%	135,356
28	Total Distribution Plant		278,804,516	3.44%	9,567,188
29	General Plant:				
30	389.1 Land		232,947	N/A	N/A
31	391.10 Off Furn & Eq.- Unspecified		508,135	6.67%	33,893
32	393 Stores Equipment		31,520	N/A	N/A
33	394.10 Tools, Garage & Service Equipment		1,430,421	3.68%	52,640
34	396 Power Operated Equipment		75,266	N/A	N/A
35	397 Communication Equipment		1,873,480	5.36%	100,419
36	397.25 Metscan Communication Equip		112,656	N/A	N/A
37	397.35 ERT Automatic Reading Dev		3,470,146	3.18%	110,351
38	Total General Plant		7,734,572	4.08%	297,303
39	Total Plant in Service		$ 299,372,252	3.46%	$ 9,864,491
40	Reserve Adjustment For Amortization [1]				
41	391.10 Off Furn & Eq.- Unspecified				(3,627)
42	394.10 Tools, Garage & Service Equipment				(26,530)
43	397 Communication Equipment				(79,858)
44	397.35 ERT Automatic Reading Dev				(35,782)
45	Total Reserve Adjustment for Amortization				(145,798)
46	Leak Prone Pipe [1]				
47	376.3 Mains - Bare Steel				464,724
48	376.8 Mains - Cast Iron				243,173
49	Total Leak Prone Pipe Amortization				707,897
50	Total Pro Forma Depreciation Expense (Line 39 + Line 45 + Line 49)				10,426,590
51	Annualized Test Year Expense [2]				$ 9,345,585
52	Increase in Depreciation Expense				$ 1,081,005

Notes
(1) Refer to Energy 4-36 Attachment 1
(2) Refer to Schedule RevReq-3-16, Page 1 of 2, Line 39

Northern Utilities, Inc.
Docket No. DG 21-104
Department of Energy Data Requests – Tech Session Set 1

Date Request Received: 1/27/22 Date of Response: 2/10/22
Request No. Energy TS 1-12 Witness: N. Allis / C. Goulding / D. Nawazelski

REQUEST:

Depreciation. Follow up to Energy 4-36.

a. Please confirm that under Whole Life, the pro forma depreciation expense would be $10,426,590. If the amount is different, please provide the correct amount and where it is located in the response to Energy 4-36
b. Please confirm that under Whole Life, the Reserve Imbalance that needs to be amortized is $(18,518,879). If the amount is different, please provide the correct amount and where it is located in the response to Energy 4-36.

RESPONSE:

a. Confirmed that the annualized depreciation expense shown in Energy 4-36 Attachment 2 is $10,426,590 using the whole life technique. This amount does include the reserve adjustment for general plant amortization accounts but does not include any amortization of the theoretical reserve imbalance.

b. Confirmed that the theoretical reserve imbalance calculated using the estimates from the depreciation study is negative $18,518,579. This amount does not include general plant amortization accounts, for which Mr. Allis would recommend a five-year amortization if either the remaining life or whole life technique were used. The negative $18,518,579 amount is the reserve imbalance to be amortized using the whole life technique, resulting in a positive amortization amount.