PAUL M. NORMAND
Principal

Experience in the electric, gas, and water industry includes project management of various cost analyses, engineering system planning and design functions, and detailed electric power loss analyses. Also, experienced in the analysis and preparation of economic and plant data, revenue requirements and presentation before state and federal regulatory agencies. Presented expert testimony on behalf of utilities in over 30 applications before regulatory commissions.

EXPERIENCE:

1984 - Present **MANAGEMENT APPLICATIONS CONSULTING, INC.**
Principal consultant providing consulting services to industry in planning, pricing, and regulation. Extensive experience in analyzing power systems for power loss studies and regulatory issues.

- Assist in gathering and updating property accounting data for depreciation studies.
- Review and analyze life analyses relating to simulated plant balances and actuarial data.
- Perform property inspections to aid in service life estimation and salvage and removal cost estimations.

1983 - 1984 **P. M. NORMAND ASSOCIATES**
Independent consultant providing services to the utility industry in cost analyses, regulatory services and expert testimony.

1976 - 1983 **GILBERT/COMMONWEALTH**, Reading, Pa.
Director, Rate Regulatory Services - Administrative and fiscal responsibility for rate and regulatory services nationally for electric, gas, and water utilities. Additional responsibilities included all marketing, research and development efforts, and contract negotiations for all studies performed by the Regulatory Service Department. Provided consulting service to utilities in project management, personnel staffing, and future development efforts.

Manager, Austin, Texas Office - Responsibility for the overall administrative and business aspects for the department in the Southwest.

Senior Management Consultant - Responsibilities included project management of various electric and gas cost-of-service studies.

Consulting Engineer - Prepared class and time-differentiated cost-of- service studies, revenue requirements exhibits, and expert testimony for formal rate proceedings before regulatory agencies. Performed forecasted ten-year cost-of-service studies by customer classes. Analyzed and prepared transmission (wheeling) rates based on cost-of-service.

Engineer - Derived system demand and energy loss factors and customer load characteristics required for cost-of-service results and related rate schedules.

1975 - 1976 **WESTINGHOUSE ELECTRIC CORPORATION,** Pittsburgh, PA
Responsible for the procurement of electrical/electronic control equipment and power cables for the nuclear reactor control system. Assisted in the development of procedures for the seismic testing of various electronic equipment related to reactor control.

1971 - 1974 **NEW ENGLAND ELECTRIC SYSTEM,** Westborough, Massachusetts
Experience from various system assignments in conjunction with formal education. Assigned to the Transmission and Distribution Department with responsibilities in several voltage conversion efforts and system planning. Development of network modeling techniques, load flow, and fault study analyses for the system planning department.

1966 - 1970 **U.S. NAVY**
Aviation electronic technician with responsibilities for maintenance and trouble-shooting of electronic communication equipment.

EDUCATION:

B.S.E.E., Electrical Engineering, Northeastern University, 1975
M.S.E.E., Electrical Power Systems, Northeastern University, 1975

Graduate Studies - MBA Program, Lehigh University and Albright College, 1977 to 1980

SOCIETIES:

Institute of Electrical and Electronic Engineers
Society of Depreciation Professionals

APPEARANCES AS EXPERT WITNESS:

Federal Energy Regulatory Commission
Arkansas Public Service Commission
Delaware Public Service Commission
Indiana Utility Regulatory Commission
Illinois Commerce Commission
Kansas Corporation Commission
Kentucky Public Service Commission
Louisiana Public Service Commission
Maine Public Utilities Commission
Maryland Public Service Commission
Massachusetts Department of Public Utilities
Missouri Public Service Commission
New Hampshire Public Utilities Commission
New Jersey Board of Public Utilities
New York Public Service Commission
North Carolina Utilities Commission
Ohio Public Utilities Commission
Pennsylvania Public Utility Commission
Rhode Island Public Utilities Commission
Texas Public Utilities Commission

PAPERS AND PRESENTATIONS:

"Probability of Dispatch Costing Method for Electric Utility Cost-of-Service Analysis." Co-authored with P. S. Hurley, presented to Edison Electric Institute Rate Research Committee May 4, 1982.

"Costing Strategies under Changing Marketing Goals and Long Term Investment Growth." Presented to Missouri Valley Electric Association (MVEA), Kansas City, MO, November 13, 1991.

DEPRECIATION STUDIES PARTICIPATION:

Central Maine Power
Chesapeake Utilities Corporation
Corning Natural Gas Corporation
Dairyland Power Cooperative
Dayton Power & Light Company
EnergyNorth Natural Gas
Fitchburg Gas and Electric Light Company
Great River Energy
Green Mountain Power
KeySpan Energy Delivery – New York
KeySpan Gas East Corporation/LILCO
Midwest Energy Inc.
Minnkota Power Cooperative
National Grid – Boston, Essex and Colonial Gas Companies
New England Gas Co./Fall River
Northern Utilities – Maine and New Hampshire Divisions
Public Service of New Mexico – Southern New Mexico Division
St. Lawrence Gas Company, Inc.
Texas-New Mexico Power Company – Texas Division & General Office
Vectren Corporation
Vermont Gas Systems, Inc.
Unitil Energy Systems, Inc.

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LIBERTY UTILITIES (ENERGYNORTH NATURAL GAS) CORP.
D/B/A LIBERTY UTILITIES

DEPRECIATION RATE STUDY

Depreciation Accrual Rates
Based on Gas Plant in Service
At December 31, 2016

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

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Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
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Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

LETTER OF TRANSMITTAL

MANAGEMENT APPLICATIONS CONSULTING, INC.

1103 Rocky Drive • Suite 201 • Reading, PA 19609-1157 • 610/670-9199 • fax 610/670-9190 •www.manapp.com

April 10, 2017

Mr. Stephen Hall
Director, Rates and Regulatory Affairs
Liberty Utilities Corp. (EnergyNorth Natural Gas) NH
15 Buttrick Road
Londonderry, NH 03053

Dear Mr. Hall:

In accordance with the authorization of your organization, Management Applications Consulting, Inc. (MAC) has completed a depreciation rate study of the depreciable gas utility property of Liberty Utilities Corp.'s EnergyNorth Natural Gas plant in service as of December 31, 2016. The results of this study are presented in the attached report.

The study was accomplished by our organization, with the assistance of Mr. David Simek and others within your organization. Our depreciation study develops accrual rates defined as straight line, broad group, and whole life.

We appreciate the opportunity to have been of service.

Respectfully,

MANAGEMENT APPLICATIONS CONSULTING, INC.

Paul M. Normand

Enclosures

PMN/rjp

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
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I. FOREWORD

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
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I. FOREWORD

This report presents the results of a detailed study of the relevant characteristics of the depreciable gas plant in service of Liberty Utilities (EnergyNorth Natural Gas) Corp.'s property. The recommendations regarding annual depreciation accrual calculations have been developed on plant in service at December 31, 2016, and are applicable until subsequent studies indicate the need for revision. In our opinion, based on our analyses, experience and judgment, the straight line, broad group, whole life depreciation accrual rates developed herein will provide for the proper and timely recovery of capital invested in the depreciable gas properties.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

II. SUMMARY

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

II. SUMMARY

A. FINDINGS

Management Applications Consulting, Inc. ("MAC") has completed a study of the service life characteristics of certain capital investments of Liberty Utilities (EnergyNorth Natural Gas) Corp.'s ("EnergyNorth" or "the Company") depreciable gas property as of December 31, 2016. The study develops average service lives, mortality characteristics, net salvage estimates, whole life accrual rates, and the reserve variance for each depreciable investment group (subaccounts and accounts).

Net salvage is gross salvage less cost to retire/remove. Based upon these elements, the study develops straight line depreciation accrual rates using the whole life technique.

1. Service Life

This study results in differences in Average Service Life (ASL) estimates from those on which the existing accrual rates are based, as shown below:

	Proposed	Existing[1]
Total Depreciable Plant average service life (years)	38.1	38.6

Both of these composite lives are based on the use of the proposed and existing average life estimates using plant in service at December 31, 2016 (reference Schedule B, Page 2).

2. Curve Types

The most commonly recognized curve type or frequency distribution is the "bell curve." Our depreciation study used a group of well recognized distributions known as the Iowa curves which were developed in the 1920s and 1930s at Iowa State University and are the most widely used and accepted curves in the industry for establishing survivor curves and average service life.

[1] Based on Case No. 06-G-1186 Depreciation Study.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

3. Net Salvage

The overall objective of depreciation is to recover the original cost investment less any salvage values plus the removal cost according to the various Uniform Systems of Accounts. The accrual rates proposed in this study reflect net salvage values based upon the most recent actual historical experience of the Company, modified by our judgment and experience.

		Whole Life	
Plant Function	Balance at 12/31/16 $000	Accruals w/o Net Salvage ($000)	Accruals with Net Salvage ($000)
Capitalized Software	14,746	2,379	2,379
Production	13,567	388	388
Storage	65	2	2
Transmission	240,206	4,077	4,664
Distribution	182,453	4,595	6,546
General	26,816	1,093	1,092
Total Depreciable Plant	477,852	12,534	15,071

In order to provide additional information with respect to the cost of removal component included in the proposed Accrual Rates, Schedule A, column (8) use the calculation presented in column (14).

4. Magnitude of Depreciation Accrual Expenses

The following table provides a comparison of the depreciation accrual expense developed by applying the effective existing and proposed accrual rates to the functional level rates of this study to the December 31, 2016 balances:

Plant Function	Balance at 12/31/16 $000	Estimated Accruals/w Proposed Rates ($000)	Estimated Accruals/w Existing Rates ($000)	Estimated Change in Accruals $ (000)
Capitalized Software	14,746	2,379	2,107	271
Production Plant	13,567	388	452	-64
Storage Plant	65	2	2	0
Transmission	240,206	4,664	4,690	-26
Distribution	182,453	6,546	6,913	-366
General	26,816	1,092	990	102
Total Depreciable Gas Plant	477,852	15,071	15,154	-83

Note that the existing and proposed rates, above, are taken from Schedule B which details a comparison of accrual rates by applicable account.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

5. Comparison of Proposed Accrual Rates

Our study developed two separate accrual rate schedules as follows:

Schedule A — Whole Life Schedule with Net Salvage – Column 8 of this schedule presents the proposed accrual rates with Net Salvage.

Schedule B — Comparison of Depreciation Accrual Rates @ 12/31/16 plant balances.

B. RECOMMENDATIONS

Based on our results of analyzing the Company's depreciable property, we recommend the following:

1. The Company request approval of the accrual rates shown in column (8) of the accrual rate Schedule A included in this report.

2. Future reviews of these accrual rates should be undertaken on a periodic basis.

3. We have identified in this study two plant accounts that will become fully depreciated and should be monitored and stopped depreciating within the next four years:

Account	Description
320.10	Other Equipment – Production
394.10	Tools, Shop & Garage Equipment – CNG Station

4. We recommend that every effort should be undertaken to book retirements on a timely basis as this impacts the resulting depreciation parameters.

5. We recommend that Account 303.03, Capitalized Software, should use the following whole life accrual rates for new dollar ($) additions:

3 year	33.33%
5 year	20.00%
10 year	10.00%

6. Our results of comparing the reserve variance (Theoretical vs. Booked) indicates that the present booked reserve is understated by $9,946,778 (Schedule A, column (13)). As a result, the Company should stop adjusting the current reserves based on the last order.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
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C. SUMMARY OF PROPOSED ACCRUAL RATES AND NET SALVAGE FACTORS

The following table lists each plant account and the average service life proposed along with the accrual rate with and without net salvage with the net salvage component shown separately. These plant accounts include all of the fully depreciated accounts identified in Section B.3., above, should the Company install future equipment in these accounts until the next depreciation study.

Account Number	Description	Iowa Curve	ASL	Accrual Rate without Net Salvage	Accrual Rate with Net Salvage
303.00	Capitalized Software	S 4.0	6.2	16.13	16.13
PRODUCTION PLANT					
305.00	Structures and Improvements	R 1.0	35.0	2.86	2.86
311.00	LP Gas Equipment	R 1.0	35.0	2.86	2.86
320.00	Other Equipment – LNG	R 1.0	35.0	2.86	2.86
320.10	Other Equipment – Production	R 1.0	35.0	2.86	2.86
STORAGE PLANT					
361.00	Structures and Improvements – LNG	R 1.0	35.0	2.86	2.86
363.50	Other Equipment – LNG	R 1.0	35.0	2.86	2.86
TRANSMISSION PLANT					
366.20	Structures and Improvements	R 1.0	35.0	2.86	2.86
366.30	Structures and Improvements – Other	R 1.0	35.0	2.86	2.86
367.00	Mains	R 3.0	60.0	1.67	1.92
369.00	Measuring and Regulating Station Equip.	S 4.0	35.0	2.86	2.86
DISTRIBUTION PLANT					
380.00	Services	R 4.0	45.0	2.22	3.55
381.00	Meters	R 3.0	32.0	3.13	3.13
381.10	Meters – Instrument	R 3.0	32.0	3.13	3.13
381.20	Meters – ERTS	SQ	15.0	6.67	6.67
382.00	Meter Installations	R 3.0	32.0	3.13	3.13
387.00	Other Equipment	S 6.0	19.0	5.26	5.26
GENERAL PLANT					
390.00	Structures and Improvements	R 1.0	35.0	2.86	2.86
391.00	Office Furniture and Equip.	S 4.0	18.0	5.56	5.28
391.10	Office Furniture and Equip. – Computers	S 4.0	10.0	10.00	10.00
391.20	Office Furniture and Equip. – Laptop Comp.	S 4.0	5.0	20.00	20.00
393.00	Stores Equipment	SQ	30.0	3.33	3.33
394.00	Tools, Shop & Garage Equipment	S 6.0	19.0	5.26	5.26
394.10	Tools, Shop & Garage Equipment – CNG Station	S 6.0	19.0	5.26	5.26
397.00	Communication Equipment	SQ	10.0	10.00	10.00
398.00	Miscellaneous General Equipment	S 5.0	15.0	6.67	6.67

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

III. INTRODUCTION

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

III. INTRODUCTION

A. STUDY AUTHORIZATION

In the first quarter of 2017, Management Applications Consulting, Inc. (MAC), of Reading, Pennsylvania was authorized to conduct a depreciation rate study of Liberty Utilities (EnergyNorth Natural Gas) Corp.'s utility properties.

The study included detailed analyses of the depreciable gas plant in service at December 31, 2016, for the purpose of recommending depreciation accrual rates reflective of current facts and projections. The techniques used were those generally recognized and accepted in the industry and included analyses of historical plant investment experience and of the Company's forecasts of expected capital, as well as reviews of recent available cost of removal (COR) and salvage experience.

B. DEFINITION OF DEPRECIATION

The overall objective of depreciation is to provide an orderly recovery of capital investment in depreciable property in a systematic and rational manner over a life term that assures full recovery of that investment. Regulatory accounting also provides for the amortization of any costs of removal expected to be incurred less anticipated salvage, i.e., net salvage, at the time the property is finally retired or removed from service by incorporating net salvage adjustments into the annual depreciation accrual rates. This approach ensures that these costs will be properly recovered by those using the facilities over the useful service life of an asset.

There are several definitions of depreciation. The definitions promulgated by the Federal Energy Regulatory Commission (FERC) and the National Association of Regulatory Utility Commissioners (NARUC) are essentially identical. Following is the NARUC definition:

> *"Depreciation", as applied to depreciable electric (gas) plant, means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of electric (gas) 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 the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand and requirements of public authorities (and, in the case of natural gas companies, the exhaustion of natural resources).*

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

C. GENERAL APPROACH TO CONDUCTING DEPRECIATION STUDIES

The MAC depreciation study analyses are consistent with the generally accepted approaches employed in the industry to determine appropriate annual depreciation accrual rates. In addition to reviewing and analyzing historical accounting records, engineering judgment is used in assessing historical experience as a possible factor to consider into the future. To this end, MAC becomes familiar with the property and its operations via site inspections and discussions with appropriate management personnel as to past practices and experience, as well as future plans and expectations, which could have had or may yet affect mortality patterns, average service lives, cost of removal or salvage. These approaches to preparing a depreciation study are typical of industry practices and provide a solid foundation for determining life estimates.

D. DEPRECIATION PROCESS

The depreciation process consists of selecting one of the more prevalent categories from each of the following three areas in order to develop a complete system in a study of utility plant:

Method	Procedure	Technique
Straight Line	Broad Group	Remaining Life (RL)
Life Span	Vintage (aged)	Whole Life (WL)
	Equal Life Group (ELG)	

E. DEPRECIATION SYSTEM (MODEL)

Our depreciation system for this study consists of using a straight line method, broad group procedure, average whole life depreciation technique which uses the same accrual factor each year over the service life of the various plant accounts and subaccounts being analyzed. Due to the existence of very large quantities of assets, utility plant is generally grouped into broad groups of plant accounts and subaccounts in which the unit of measure is the original cost dollar, as opposed to individual property units.

Finally, depreciable plant must be recovered over a defined period of time, and our depreciation model used the whole life technique for calculating the annual accrual rates proposed as prescribed by the New Hampshire Public Utilities Commission (PUC). These rates are derived by using an estimated service life and a mortality distribution based on Iowa curves and include the calculated net salvage for each plant account:

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
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$$\text{Whole Life Accrual Rate} = \frac{\text{100\% – Net Salvage}}{\text{Average Service Life}}$$

The account-by-account summary results are presented in the attached Schedule A of Depreciation in column (4) without any net salvage and column (8) with the net salvage factored into the proposed accrual rate.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
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IV. DEVELOPMENT OF DEPRECIATION STUDY

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

IV. DEVELOPMENT OF DEPRECIATION STUDY

A. DATABASE

The starting point of our depreciation study is the development of a database which utilizes the Company's additions, retirements, adjustments, transfers and plant balances by depreciable account and subaccount. Our analyses varied by account in order to develop appropriate databases from which to prepare our study based on available data.

B. ANALYSIS OF HISTORY

The historical life analysis employed in this study was the Simulated Plant Record – Balances (SPR_BAL). The SPR-BAL analysis was introduced in 1947 by Mr. Alex Bauhan of Public Service Electric and Gas and is widely used and accepted in the industry.

The analyses are trial-and-error procedures in which the survivor statistics for various empirical (usually Iowa) curves are applied to the actual annual addition amounts to generate simulated year-end balances which are then compared to actual year-end balances. The best-fitting life is found for each curve type, and the curve-life combinations are ranked according to the sum of the squared differences between actual and simulated balances. In the procedure, there are three key statistical reliability indications developed for each curve-life combination. They are: the conformance index (CI), which is mathematically interrelated to the sum of the squared differences between the book and simulated balances; the retirement experience index (REI), or retirement index (RI); and the cycle index. The retirement index is the percent retired from the oldest addition with the given indicated curve-life combination. The cycle index is the age of the oldest addition as a percent of the maximum probable life of the given curve-life combination. Maximum Probable Life (MPL) is the age at which the survivor curve drops to zero surviving. With a standard bell/symmetrical curve, the MPL is twice the average service life.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

The relationships for CI[2] and RI[3] are shown below:

CI	Value
Over 75	Excellent
50 to 75	Good
25 to 50	Fair
Under 25	Poor

RI	Value
Over 75	Excellent
50 to 75	Good
33 to 50	Fair
17 to 33	Poor
Under 17	Valueless

The findings of life analyses of history, such as the SPR analyses, regrettably are often over-emphasized; however, the key role of the depreciation engineer is life-estimation, not life analysis. Any depreciation study requires informed judgment. The depreciation expert must know the equipment within the group being studied; he must be familiar with the types of life analyses employed, the effect on these life analyses of a number of events. The proposed recommendations embody all of the underlying results as a foundation with which to indicate a direction to be considered in arriving at the final chosen depreciation parameters and results for this study. We are predicting the expected remaining life of a Company's various asset categories.

C. SALVAGE, COST OF REMOVAL (COR) AND NET SALVAGE ANALYSIS

The Company provided limited historical data for gross salvage and cost of removal by account, the net salvage values were simply calculated as their difference:

Net Salvage (NS) = Gross Salvage (GS) – Cost of Removal (COR)

These data do not reflect the most recent two years since the Company has not recorded this information.

The inclusion of a net salvage component in determining the annual accrual rate for each account is a well-recognized and appropriate calculation. Our proposed net salvage and cost of removal are shown in the attached Schedule A of this study.

[2] Public Utility Depreciation Practices, NARUC, August 1996, p. 96.
[3] Public Utility Depreciation Practices, NARUC, August 1996, p. 97.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

V. DISCUSSION OF RESULTS

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

V. DISCUSSION OF RESULTS

A. APPLICATION OF COST RECOVERY

The whole life accrual rate is a function of two variables: the estimated net salvage (salvage less cost to retire) and the average service life of the group. The continued use of accrual rates properly developed at one point in time as a function of all circumstances known and projected at that time can be assumed to be appropriate for a limited number of years; however, if the lives and net salvage are not re-estimated periodically, the rates may not provide the appropriate recovery of capital.

Obviously, when a change in either net salvage or life expectations is observed, the book depreciation reserve compared to the computed or theoretical reserve immediately appears as either over or under accrued. Realistic trends in either the service life or net salvage cannot generally be discerned on an annual basis; therefore, if such changes begin to occur immediately upon completion of a depreciation rate study, it might be five years later (in the subsequent study) until the effect of the change is fully observed and reflected in revised accrual rates.

In general, the variance in the reserve is simply the difference between theoretical reserve based on an updated set of factors as developed in a depreciation study and the existing book reserves which reflect the historical reserve adjustments previously approved. The theoretical reserve calculation, however, is based on a new set of accrual rates, and applying these results to the current plant balances as if they were constant historical factors will result in a variance. Obviously, there will usually be changes in depreciation rates followed by changes in theoretical reserves and resulting variances.

One reasonable method to eliminate or reduce this difference (variance) between the book and theoretical depreciation reserve is to amortize the variance over some reasonable time period, as previously mentioned. By this we mean one computes the annual depreciation accrual in the normal manner and each year adds to or subtracts from that normal accrual an amortization amount, derived as described previously.

For some categories of property, particularly mass properties, statistical mortality studies of past retirement experience may provide historical indications of the dispersion of retirements and of average service life if there has been sufficient retirement activity over a reasonable period of time. Such information may provide some indication as to what to expect in the future; however, it should not be taken for granted that the future will mirror the past, especially when present policies, plans, or external circumstances indicate otherwise.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

B. AVERAGE SERVICE LIFE AND SURVIVOR CURVES

Survivor curves are graphical representations of the surviving property for each age for the life of a group of assets, such as a plant account. The survivor curve selected from analyses of the Company's database for each account then establishes the average and remaining life for that group. These survivor curve characteristics are generally best reflected for utility property by the use of a well-established system of generalized survivor curves known in the industry as Iowa curves. For example, for Services Account 380, our recommended Iowa curve is a 45-year R 4.0. The 60 years represent the average service life estimate, and the other component is the shape of the curve. Finally, the number following the letter for each curve represents the height of each curve with the higher values representing a reduced range and maximum life. The letter designation indicates the skewness with an "R" indicating a skewness towards a later retirement tendency. The other possible letter, which is an "L," indicates earlier retirements, and an "S" for a symmetrical implies that the greatest retirement frequency is at the ASL.

C. THEORETICAL DEPRECIATION RESERVE

The objective of depreciation is complete and timely recovery of depreciable plant investment less net salvage. Periodic reviews and revisions to accrual rates help to minimize the magnitude of the revisions which may be necessary to keep the recovery process in tune. Obviously, when a change in either life expectations or net salvage is made, the book depreciation reserve immediately appears either over or under accrued. Changes to either the life or net salvage cannot generally be discerned on an annual basis; therefore, if such changes began to occur immediately upon completion of one depreciation rate study, it might be five years later (in another study) before the effect of the change is observed and the accrual rates properly adjusted to reflect it.

The theoretical depreciation reserve is a calculated level of reserve requirement based on a new set of depreciation parameters chosen in a study. In other words, the theoretical reserve is the future amounts of depreciation expense to be charged if the future retirements follow the recommended mortality characteristics in this study. The theoretical reserve is therefore the best estimate of reserve levels from the study if all future retirements occur as proposed by the recommended parameters for each account.

The results from the derived theoretical reserve calculations can be compared to the Company's actual booked reserve for each account to provide further information to the analysis as to any significant imbalances (+ or – differences). The approach to adjusting any of these differences is called a rebalancing of booked reserves in line with the theoretical reserves to better reflect the proposed depreciation study parameters and

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results until the next study. This process eliminates any account imbalances that have occurred historically based on prior parameters and associated accrual rates.

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VI. ACCOUNT-BY-ACCOUNT ANALYSIS AND RECOMMENDATIONS

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VI. ACCOUNT-BY-ACCOUNT ANALYSIS AND RECOMMENDATIONS

Appendix A contains the depreciation accrual schedules from the Company's last study (calendar year 2006) which are referenced in the following discussion of each primary account for the Company along with the Company's current Commission-approved accrual rates in Appendix B.

NOTES:

1 – *Current $ Value* from Schedule A
2 – *Prior Plant $* from Appendix A – Case No. 06-G-1186
3 – *Booked* and *Theoretical Reserves* from Schedule A
4 – *Ratio %* referenced to account 2016 Plant Balance
5 – *Percent* that each account is to Total Depreciable Plant (Schedule A)
6 – *Account Descriptions* containing parentheses at the end reflect prior study (2005) account numerical designation (for reference purposes)
7 – *Conformance Index (CI)* – Reference page 20
8 – *Retirement Index (RI)* – Reference page 20
9 – The *number shown in the parentheses (xxxx)* for each account to the right of the description references the prior study PUC account designation – See Appendix A
10 – *Accrual rates* for each account are based on Whole Life (WL)

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
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PRODUCTION PLANT

Account: 303.03 Capitalized Software (1372.1)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	14,745,889	3.1	5,842,671
Booked Reserve:	4,975,703	33.7	
Theoretical Reserve:	5,708,940	38.7	

Recommendations		
	Prior	Proposed
Average Service Life:	7.0	6.2
Retirement Curve:		S 4.0
Future Net Salvage:		0%
Accrual Rates:		
With Net Salvage	5.28	16.13
Without Net Salvage	5.56	16.13

Account Description

This account contains various software which represents the majority of the account dollars with varying service lives.

Service Life Analysis

A review of this account indicates the existing 7.0-year ASL may be too long given the software included in this account. We therefore recommend a change from a 7.0-year ASL to a 6.2-year ASL with an S 4.0 Iowa curve. Our service life of 6.2 years represents a composite dollar-weighted average of the existing 3-,5-, , and 10-year software life.

New investment dollars should use the following Whole Life accrual rates:

WEIGHTED AVERAGE OF ACCOUNT 303 ASL

ASL	PLANT $	WEIGHTED $	WHOLE LIFE DEPRECIATION ACCRUAL RATE – WL
3	98,430.39	295,391.17	33.33
5	11,150,472.67	55,752,363.35	20.00
10	3,482,488.93	34,824,889.30	10.00
	14,731,391.99	90,872,543.82	

Net Salvage

There is no salvage value related to this account.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
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Account: 305.00 Structures and Improvements (1308.1)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	1,975,163	0.4	1,195,433
Booked Reserve:	1,374,447	70.0	
Theoretical Reserve:	818,047	41.4	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	35.0
Retirement Curve:	R 1.0	R 1.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	2.86
Without Net Salvage	3.33	2.86

Account Description

This account consists of various facility-related costs.

Service Life Analysis

Our review of this account indicates that ASL should be increased, and we recommend increasing the current 30-year ASL to a 35-year ASL while maintaining the same R 1.0 Iowa curve type.

Net Salvage

Our review of the historical data provides no support to any change to the current 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
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Account: 311.00 LP Gas Equipment (1330)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	258,481	0.1	207,767
Booked Reserve:	63,766	24.7	
Theoretical Reserve:	59,141	22.9	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	35.0
Retirement Curve:	R 1.0	R 1.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	2.86
Without Net Salvage	3.33	2.86

Account Description

This account contains Liquefied Petroleum Gas-related equipment.

Service Life Analysis

Our review of this account indicates that an increase in the ASL is appropriate, and we recommend changing the existing 30-year ASL to a 35-year level while maintaining the same R 1.0 Iowa curve type.

Net Salvage

Our review of the historical data indicates no support for any change to the current approved 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 320.00 Other Equipment – LNG (1330)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	2,556,209	0.5	727,373
Booked Reserve:	364,891	14.3	
Theoretical Reserve:	357,489	14.0	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	35.0
Retirement Curve:	R 1.0	R 1.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	2.86
Without Net Salvage	3.33	2.86

Account Description

This account includes various equipment related to the production of Liquefied Natural Gas facilities.

Service Life Analysis

Our review of this account indicates that an increase in ASL is warranted, and we recommend increasing the current 30-year to a 35-year ASL while maintaining the same R 1.0 Iowa curve type.

Net Salvage

Our review of the historical data provides no support for any change to the currently approved 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 320.10 Other Equipment – Production (1330)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	8,777,306	1.8	7,772,238
Booked Reserve:	7,765,237	88.5	
Theoretical Reserve:	4,967,873	56.6	

Recommendations		
	Prior	Proposed
Average Service Life:	30	35
Retirement Curve:	R 1.0	R 1.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	2.86
Without Net Salvage	3.33	2.86

Account Description

This account includes equipment used in the production of gas.

Service Life Analysis

Our review of this account indicates an increase in ASL is appropriate. We recommend changing the existing 30-year ASL to a 35-year ASL while no change to the R 1.0 Iowa curve is warranted. Please note our recommendations for this account on page 11, Section B.

Net Salvage

Our review of the historical data indicates no support for a change to the current approved 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

STORAGE PLANT

Account: 361.00 Structures and Improvements – LNG (1330)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	57,345	0.0	57,345
Booked Reserve:	9,179	16.0	
Theoretical Reserve:	13,371	23.3	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	35.0
Retirement Curve:	R 1.0	R 1.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	2.86
Without Net Salvage	3.33	2.86

Account Description

This account consists of various facilities related to LNG.

Service Life Analysis

Our analyses of the historical data suggest that a change in ASL is warranted, and we recommend increasing the current 30-year ASL to 35 years while maintaining the current R 1.0 Iowa curve type.

Net Salvage

Our review of the historical data indicates no support for any change to the currently approved 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 363.50 Other Equipment – LNG (1330)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	7,646	0.0	7,646
Booked Reserve:	1,560	20.4	
Theoretical Reserve:	1,783	23.3	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	35.0
Retirement Curve:	R 1.0	R 1.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	2.86
Without Net Salvage	3.33	2.86

Account Description

This account consists of other equipment used in connection with the storage of gas.

Service Life Analysis

Our review of the other LNG accounts suggests that this equipment be assigned the same depreciation parameters, and we recommend setting the ASL at a 35-year level versus the existing 30 years while maintaining the same R 1.0 Iowa curve type.

Net Salvage

Our review of the historical data provides no support for changing the currently approved 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

TRANSMISSION PLANT

Account: 366. 20 Structures and Improvements (1308.6)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	269,809	0.1	230,981
Booked Reserve:	177,630	65.8	
Theoretical Reserve:	119,856	44.4	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	35.0
Retirement Curve:	R 1.0	R 1.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	2.86
Without Net Salvage	3.33	2.86

Account Description

This account includes various facilities used to support transmission plant.

Service Life Analysis

Our analyses indicate that an increase in ASL is warranted, and we recommend a 35-year ASL versus the existing 30 years while maintaining the current R 1.0 Iowa curve type.

Net Salvage

Our review of the historical data provides no support for changing the currently approved 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 366.30 Structures and Improvements – Other (1308.6)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	353,851	0.1	313,341
Booked Reserve:	278,219	78.6	
Theoretical Reserve:	192,816	54.5	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	35.0
Retirement Curve:	R 1.0	R 1.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	2.86
Without Net Salvage	3.33	2.86

Account Description

This account includes various facilities used to support the Distribution function.

Service Life Analysis

Our analysis of the historical data indicates that an increase in ASL is warranted, and we recommend increasing the current 30-year life to 35 years while maintaining the same Iowa curve type of R 1.0.

Net Salvage

Our review of the historical data provides no support for changing the current 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 367.00 Mains (1356)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	234,672,697	49.1	136,231,396
Booked Reserve:	54,187,131	23.1	
Theoretical Reserve:	63,315,172	27.0	

Recommendations		
	Prior	Proposed
Average Service Life:	60.0	60.0
Retirement Curve:	R 1.0	R 3.0
Future Net Salvage:	-15%	-15%
Accrual Rates:		
With Net Salvage	1.92	1.92
Without Net Salvage	1.67	1.67

Account Description

This account contains various types and sizes of pipe utilized in the delivery of gas to customers.

Service Life Analysis

Our analyses of this account were based on total assets since the Company could not provide any historical details by material type for analyses. In addition, our recommendations are to maintain the same ASL of 60 years based on the results, although we note that the recording of retirements for the last two years has been backlogged. We do understand, however, that the Company anticipates getting caught up on the retirements for this account by the end of the second quarter of 2017, at which point this analysis may be revisited.

Net Salvage

Our review of the available historical data supports the current approved levels. However, as described above, the retirement activity has been backlogged. We strongly suspect that the retirement activity requirements would continue to support our maintaining the current approved levels.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 369.00 Measuring and Regulating Station Equipment (1358)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	4,909,208	1.0	2,473,039
Booked Reserve:	1,889,616	38.5	
Theoretical Reserve:	1,782,000	36.3	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	35.0
Retirement Curve:	S 0.0	S 4.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	2.86
Without Net Salvage	3.33	2.86

Account Description

This equipment is used to maintain pressure in the Company's Distribution infrastructure.

Service Life Analysis

Our analyses of the historical data indicate that a slight increase in ASL is warranted, and we recommend increasing the current 30-year ASL to a 35-year ASL recognizing that the Company has not been recording retirements for several years.

Net Salvage

Our review of the available historical data provides no support for changing the currently approved 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

DISTRIBUTION PLANT

Account: 380.00 Services (1359)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	146,720,226	30.7	80,850,399
Booked Reserve:	66,714,617	45.5	
Theoretical Reserve:	68,883,816	47.0	

Recommendations		
	Prior	Proposed
Average Service Life:	40.0	45.0
Retirement Curve:	R 4.0	R 4.0
Future Net Salvage:	-60%	-60%
Accrual Rates:		
With Net Salvage	4.00	3.55
Without Net Salvage	2.50	2.22

Account Description

This account consists mainly of various small pipe sizes and types for connecting customers to the Company's mains.

Service Life Analysis

Our analyses of this account were based on total assets since the Company could not provide any historical details by material type for any analyses. In addition, our recommendations are a modest increase which also recognizes that the recording of retirements for this account for the most recent two years has been backlogged. As a result, we recommend maintaining the same R 4.0 Iowa-type curve. We do understand that the company anticipates getting caught up on the retirements for this account by the end of the second quarter of 2017, at which point this analysis may be revisited.

Net Salvage

Our review of the available historical data supports the current approved levels. However, there is no available data for the last two years relating to any retirement activity which has not been recorded by the Company to provide any additional background. We strongly suspect that the retirement activity requirements would continue to support our maintaining the current approved levels.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 381.00 Meters (1360)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	14,628,345	3.1	10,880,759
Booked Reserve:	7,838,363	53.6	
Theoretical Reserve:	6,058,054	41.4	

Recommendations		
	Prior	Proposed
Average Service Life:	35.0	32.0
Retirement Curve:	R 2.5	R 3.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	2.86	3.13
Without Net Salvage	2.86	3.13

Account Description

This account consists of various sizes of meters that record gas consumption at customer locations in the Company's Service area.

Service Life Analysis

Our analyses of this account indicate that a change in the current 35-year ASL is warranted, and we recommend a lower 32-year life with a minor change of the Iowa curve from the current R 2.5 to an R 3.0 curve type.

Net Salvage

Our review of the historical data indicates no support for any change to the currently approved 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 381.10 Meters – Instrument (1360)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	188,398	0.0	98,530
Booked Reserve:	31,378	16.7	
Theoretical Reserve:	46,943	24.9	

Recommendations		
	Prior	Proposed
Average Service Life:	35.0	32.0
Retirement Curve:	R 2.5	R 3.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	2.86	3.13
Without Net Salvage	2.86	3.13

Account Description

Various equipment supporting metering.

Service Life Analysis

The same depreciation parameters were applied as recommended for Account 381.00 meters.

Net Salvage

Our recommended net salvage of 0% is the same as Account 381.00 Meters.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 381.20 Meters – ERTS (1360)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	5,647,769	1.2	5,028,696
Booked Reserve:	2,073,245	36.7	
Theoretical Reserve:	4,689,816	83.0	

Recommendations		
	Prior	Proposed
Average Service Life:	35.0	15.0
Retirement Curve:	R 2.5	SQ
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	2.86	6.67
Without Net Salvage	2.86	6.67

Account Description

The equipment in this account consists of remote metering modules installed on existing meters. ERTS is Encoder, Receiver, Transmitter device.

Service Life Analysis

Our recommendation is a proposed 15-year life for this electronic equipment to reflect the rapidly changing life of electronic equipment and security.

Net Salvage

Our proposed net salvage of 0% represents the value of electronic instrumentation after 15 years with technology changes.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 382.00 Meter Installations (1360)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	14,360,005	3.0	5,184,258
Booked Reserve:	2,510,354	17.5	
Theoretical Reserve:	3,013,872	21.0	

Recommendations		
	Prior	Proposed
Average Service Life:	35.0	32.0
Retirement Curve:	R 2.5	R 3.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	2.86	3.13
Without Net Salvage	2.86	3.13

Account Description

This equipment relates to the remaining costs and piping to accept the various types of meters at customer locations.

Service Life Analysis

Our recommendations are to retain the same depreciation parameters as the Account 381 Meters.

Net Salvage

Our experience indicates a very small amount of net salvage can be anticipated, but we are recommending 0% net salvage consistent with the Account 381 Meters.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 387.00 Other Equipment (1377)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	908,013	0.2	453,514
Booked Reserve:	339,112	37.4	
Theoretical Reserve:	410,276	45.2	

Recommendations		
	Prior	Proposed
Average Service Life:	19.0	19.0
Retirement Curve:	S 6.0	S 6.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	5.26	5.26
Without Net Salvage	5.26	5.26

Account Description

This account consists of miscellaneous tools utilized to support the Company's generation.

Service Life Analysis

Our analyses of the historical data indicate that the current depreciation parameters of a 19-year ASL and an S 6.0 Iowa curve type should be maintained.

Net Salvage

A review of the available historical data provides no support for changing the currently approved 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

GENERAL PLANT

Account: 390.00 Structures and Improvements (1308.7)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	22,070,702	4.6	1,497,999
Booked Reserve:	3,314,051	15.0	
Theoretical Reserve:	2,218,786	10.1	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	35.0
Retirement Curve:	R 1.0	R 1.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	2.86
Without Net Salvage	3.33	2.86

Account Description

A major cost for this account relates to the Company's improvements to a building at 15 Buttrick Road, Londonderry, NH. This building was completely renovated and is the location of the new main office for the Company.

Service Life Analysis

Our analyses indicate that an increase in ASL is warranted, and we recommend increasing the current 30-year life to 35 years while maintaining the current R 1.0 Iowa curve type.

Net Salvage

Our review of the available historical data provides no support for any change to the existing 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 391.00 Office Furniture and Equipment (1372.1)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	285,566	0.1	150,501
Booked Reserve:	26,275	9.2	
Theoretical Reserve:	41,929	14.7	

Recommendations		
	Prior	Proposed
Average Service Life:	18.0	18.0
Retirement Curve:	S 4.0	S 4.0
Future Net Salvage:	5%	5%
Accrual Rates:		
With Net Salvage	5.28	5.28
Without Net Salvage	5.56	5.56

Account Description

Miscellaneous office equipment.

Service Life Analysis

The statistical results of our analyses for this account were very poor and provided no support for any change to the existing depreciation parameters of an 18-year ASL with an S 4.0 curve-type combination.

Net Salvage

We have maintained the currently approved 5% net salvage based on our experience for similar facilities.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 391.10 Office Furniture and Equipment – Computers (1372.1)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	1,840,911	0.4	1,530,737
Booked Reserve:	297,543	16.2	
Theoretical Reserve:	1,179,639	64.1	

Recommendations		
	Prior	Proposed
Average Service Life:	18.0	10.0
Retirement Curve:	S 4.0	S 4.0
Future Net Salvage:	5%	0%
Accrual Rates:		
With Net Salvage	5.28	10.00
Without Net Salvage	5.56	10.00

Account Description

This account consists of various computer-related equipment and peripherals for use in supporting the Company's infrastructure.

Service Life Analysis

Our review of the equipment placed in service for this account does not support the current 18-year ASL, and we recommend a much more reasonable 10-year ASL as reflective of this equipment based on our experience.

Net Salvage

Based on our review of the equipment in this account and the recommended 10-year ASL, we find no support to maintain the existing 5% net salvage level and recommend a 0% level until the Company's next study. This is in part due to the recommended 10-year average service life coupled with the fact that a major portion of this account's equipment will reach technical obsolescence well before the estimated life.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 391.20 Office Furniture and Equipment – Laptop Computers (1372.1)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	679,916	0.1	1,090
Booked Reserve:	81,882	12.0	
Theoretical Reserve:	349,087	51.3	

Recommendations		
	Prior	Proposed
Average Service Life:	18.0	5.0
Retirement Curve:	S 4.0	S 4.0
Future Net Salvage:	5%	0%
Accrual Rates:		
With Net Salvage	5.28	20.00
Without Net Salvage	5.56	20.00

Account Description

This equipment represents more local personal computers used by personnel to perform their job-related duties.

Service Life Analysis

Our recommendation of a five-year ASL using an S 4.0 type of Iowa curve reflects our experience with this type of equipment.

Net Salvage

Based on our experience, laptop computers have little value after just a few years supporting our 0% net salvage.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 393.00 Stores Equipment (1374)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	99,421	0.0	43,120
Booked Reserve:	28,007	28.2	
Theoretical Reserve:	19,569	19.7	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	30.0
Retirement Curve:	SQ	SQ
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	3.33
Without Net Salvage	3.33	3.33

Account Description

This account contains various smaller equipment used to support distribution facilities.

Service Life Analysis

No analyses were undertaken for this account due to the limited data availability, and we recommend maintaining the current 30-year ASL with an SQ curve type.

Net Salvage

Our review of the available data provides no support for any change to the existing 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 394.00 Tools, Shop & Garage Equipment (1377)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	825,963	0.2	314,087
Booked Reserve:	347,637	42.1	
Theoretical Reserve:	270,641	32.8	

Recommendations		
	Prior	Proposed
Average Service Life:	19.0	19.0
Retirement Curve:	S 6.0	S 6.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	5.26	5.26
Without Net Salvage	5.26	5.26

Account Description

Miscellaneous equipment used to support distribution plant.

Service Life Analysis

The statistical results of our analyses for this account were very poor and provided no support for any change to the existing 19-year ASL and an S 6.0 Iowa curve combination.

Net Salvage

Our review of the available historical data provided no support for any change to the existing 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 394.10 Tools, Shop & Garage Equipment – CNG Station (1330)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	221,199	0.1	221,199
Booked Reserve:	192,912	87.2	
Theoretical Reserve:	203,415	92.0	

Recommendations		
	Prior	Proposed
Average Service Life:	30.0	19.0
Retirement Curve:	R 1.0	S 6.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	3.33	5.26
Without Net Salvage	3.33	5.26

Account Description

This account contains equipment related to the operation of CNG Stations.

Service Life Analysis

Our review and analysis of this data support a change in ASL from the existing 30-year R 1.0 parameters to a 19-year S 6.0 Iowa-type curve combination.

Net Salvage

Our review of the available data supports no change from the current 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 397.00 Communication Equipment (1378)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	443,965	0.1	364,639
Booked Reserve:	212,912	48.0	
Theoretical Reserve:	343,778	77.4	

Recommendations		
	Prior	Proposed
Average Service Life:	15.0	10.0
Retirement Curve:	R 3.0	SQ
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	6.67	10.00
Without Net Salvage	6.67	10.00

Account Description

This account consists of various electronic equipment used by Company personnel.

Service Life Analysis

Our historical statistical analyses were very poor. However, our experience with electronic equipment and added security prompts us to recommend a 10-year ASL with an SQ-type curve.

Net Salvage

As with any electronics, the rapidly changing technology along with a 10-year ASL supports little value for this type of equipment, and we recommend maintaining the current 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Account: 398.00 Miscellaneous General Equipment (1379)

	Current Value	Ratio %	Prior Plant
Test Year:	2016		2006
Plant Balance:	348,302	0.1	107,360
Booked Reserve:	151,520	43.5	
Theoretical Reserve:	127,856	36.7	

Recommendations		
	Prior	Proposed
Average Service Life:	15.0	15.0
Retirement Curve:	S 5.0	S 5.0
Future Net Salvage:	0%	0%
Accrual Rates:		
With Net Salvage	6.67	6.67
Without Net Salvage	6.67	6.67

Account Description

This account has various smaller equipment used to support distribution facilities.

Service Life Analysis

Our historical statistical analyses were very poor which provides no support to change our existing 15-year ASL with an Iowa S 5.0 curve combination.

Net Salvage

Our review of available historical data provide no support for any change to the existing 0% net salvage level.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

VII. ACCRUAL RATE SCHEDULE AND DESCRIPTIONS

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Schedule A

Schedule of Proposed Depreciation Accrual Rates – Whole Life Schedule with Reserve Variance @ 12/31/16

LIBERTY UTILITIES (ENERGYNORTH NATURAL GAS) CORPORATION
SCHEDULE OF DEPRECIATION ACCRUAL RATES @12/31/16
WHOLE LIFE SCHEDULE WITH RESERVE VARIANCE

SCHEDULE A

FERC ACCOUNT NUMBER	DESCRIPTION	PLANT BALANCE @12/31/16	DISP TYPE	ASL	ACCRUAL RATE W/O NET SALV.	ACCRUAL WITHOUT NET SALV.	NET SALV. %	SALV. FACTOR	ACCRUAL RATE W/ NET SALV.	ACCRUAL WITH NET SALV.	THEO. RSV. WITHOUT NET SALV.	THEO. RSV. WITH NET SALV.	BOOK RSV. @12/31/16	RESERVE VARIANCE	COR RATE %
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
303.00	CAPITALIZED SOFTWARE	14,745,889	S 4.0	6.2	16.13	2,378,512	0	1.00	16.13	2,378,512	5,708,940	5,708,940	4,975,703	733,237	0.00
	PRODUCTION PLANT														
305.00	STRUCTURES AND IMPROVEMENTS	1,975,163	R 1.0	35.0	2.86	56,490	0	1.00	2.86	56,490	818,047	818,047	1,374,447	-556,400	0.00
311.00	LP GAS EQUIPMENT	258,481	R 1.0	35.0	2.86	7,393	0	1.00	2.86	7,393	59,141	59,141	63,766	-4,625	0.00
320.00	OTHER EQUIPMENT-LNG	2,556,209	R 1.0	35.0	2.86	73,108	0	1.00	2.86	73,108	357,489	357,489	364,891	-7,402	0.00
320.10	OTHER EQUIPMENT-PRODUCTION	8,777,306	R 1.0	35.0	2.86	251,031	0	1.00	2.86	251,031	4,967,873	4,967,873	7,765,237	-2,797,364	0.00
	TOTAL DEPREC. PRODUCTION PLANT	13,567,159		35.0	2.86	388,021			2.86	388,021	6,202,550	6,202,550	9,568,341	-3,365,791	
	STORAGE PLANT														
361.00	STRUCTURES AND IMPROVEMENTS-LNG	57,345	R 1.0	35.0	2.86	1,640	0	1.00	2.86	1,640	13,371	13,371	9,179	4,192	0.00
363.50	OTHER EQUIPMENT-LNG	7,646	R 1.0	35.0	2.86	219	0	1.00	2.86	219	1,783	1,783	1,560	223	0.00
	TOTAL DEPREC. STORAGE PLANT	64,991		35.0	2.86	1,859			2.86	1,859	15,154	15,154	10,739	4,415	
	TRANSMISSION PLANT														
366.20	STRUCTURES AND IMPROVEMENTS	269,809	R 1.0	35.0	2.86	7,717	0	1.00	2.86	7,717	119,856	119,856	177,630	-57,774	0.00
366.30	STRUCTURES AND IMPROVEMENTS-OTHER	353,851	R 1.0	35.0	2.86	10,120	0	1.00	2.86	10,120	192,816	192,816	278,219	-85,403	0.00
367.00	MAINS	234,672,697	R 3.0	60.0	1.67	3,919,034	-15	1.15	1.92	4,505,716	55,056,671	63,315,172	54,187,131	9,128,041	0.25
369.00	MEASURING AND REGULATING STATION EQUIP.	4,909,208	S 4.0	35.0	2.86	140,403	0	1.00	2.86	140,403	1,782,000	1,782,000	1,889,616	-107,616	0.00
	TOTAL DEPREC. TRANSMISSION PLANT	240,205,565		59.0	1.70	4,077,274			1.94	4,663,956	57,151,343	65,409,844	56,532,596	8,877,248	
	DISTRIBUTION PLANT														
380.00	SERVICES	146,720,226	R 4.0	45.0	2.22	3,257,189	-60	1.60	3.55	5,208,568	43,052,385	68,883,816	66,714,617	2,169,199	1.33
381.00	METERS	14,628,345	R 3.0	32.0	3.13	457,867	0	1.00	3.13	457,867	6,058,054	6,058,054	7,838,363	-1,780,309	0.00
381.10	METERS-INSTRUMENT	188,398	R 3.0	32.0	3.13	5,897	0	1.00	3.13	5,897	46,943	46,943	31,378	15,565	0.00
381.20	METERS-ERTS	5,647,769	SQ	15.0	6.67	376,706	0	1.00	6.67	376,706	4,689,816	4,689,816	2,073,245	2,616,571	0.00
382.00	METER INSTALLATIONS	14,360,005	R 3.0	32.0	3.13	449,468	0	1.00	3.13	449,468	3,013,872	3,013,872	2,510,354	503,518	0.00
387.00	OTHER EQUIPMENT	908,013	S 6.0	19.0	5.26	47,761	0	1.00	5.26	47,761	410,276	410,276	339,112	71,164	0.00
	TOTAL DEPREC. DISTRIBUTION PLANT	182,452,756		39.7	2.52	4,594,889			3.59	6,546,268	57,271,346	83,102,777	79,507,069	3,595,708	
	GENERAL PLANT														
390.00	STRUCTURES AND IMPROVEMENTS	22,070,702	R 1.0	35.0	2.86	631,222	0	1.00	2.86	631,222	2,218,786	2,218,786	3,314,051	-1,095,265	0.00
391.00	OFFICE FURNITURE AND EQUIP.	285,566	S 4.0	18.0	5.56	15,877	5	0.95	5.28	15,078	44,136	41,929	26,275	15,654	0.00
391.10	OFFICE FURNITURE AND EQUIP.-COMPUTERS	1,840,911	S 4.0	10.0	10.00	184,091	0	1.00	10.00	184,091	1,179,639	1,179,639	297,543	882,096	0.00
391.20	OFFICE FURNITURE AND EQUIP.-LAPTOP COMP.	679,916	S 4.0	5.0	20.00	135,983	0	1.00	20.00	135,983	349,087	349,087	81,882	267,205	0.00
393.00	STORES EQUIPMENT	99,421	SQ	30.0	3.33	3,311	0	1.00	3.33	3,311	19,569	19,569	28,007	-8,438	0.00
394.00	TOOLS, SHOP & GARAGE EQUIPMENT	825,963	S 6.0	19.0	5.26	43,446	0	1.00	5.26	43,446	270,641	270,641	347,637	-76,996	0.00
394.10	TOOLS, SHOP & GARAGE EQUIPMENT-CNG STATION	221,199	S 6.0	19.0	5.26	11,635	0	1.00	5.26	11,635	203,415	203,415	192,912	10,503	0.00
397.00	COMMUNICATION EQUIPMENT	443,965	SQ	10.0	10.00	44,397	0	1.00	10.00	44,397	343,778	343,778	212,912	130,866	0.00
398.00	MISCELLANEOUS GENERAL EQUIPMENT	348,302	S 5.0	15.0	6.67	23,232	0	1.00	6.67	23,232	127,856	127,856	151,520	-23,664	0.00
	TOTAL DEPREC. GENERAL PLANT	26,815,945		24.5	4.08	1,093,194			4.07	1,092,394	4,756,907	4,754,700	4,652,739	101,961	
	TOTAL DEPREC. GAS PLANT	477,852,305		38.1	2.62	12,533,748			3.15	15,071,009	131,106,240	165,193,965	155,247,187	9,946,778	
	AMORTIZED PLANT														
392	TRANSPORTATION EQUIPMENT	2,566,140		5.0	20.00	513,228	0	1.00	20.00	513,228			623,499		0.00
396	POWER OPERATED EQUIPMENT	491,943		5.0	20.00	98,389	0	1.00	20.00	98,389			430,651		0.00
	TOTAL AMORTIZED PLANT	3,058,083		5.0	20.00	611,617			20.00	611,617			1,054,150		
	TOTAL DEPREC. & AMORTIZED GAS PLANT	480,910,388		36.6	2.73	13,145,364			3.26	15,682,626			156,301,337		
1211	OPI-STRUCTURES-RETAINED												133,284		
304/365	LAND & LAND RIGHTS	592,018													
389.00	GNL LAND & LAND RIGHTS	16,806													
1012	ARO	139,286													
	DIFF. IN ACCOUNT 367 & 380 BAL. VS PUC ANNUAL REPORT	8,352													
	TOTAL GAS PLANT IN SERVICE	481,666,850											156,434,621		

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WHOLE LIFE SCHEDULE WITH RESERVE VARIANCE

EXPLANATORY NOTES

The Schedule includes indicated (theoretical) reserves both with and without net salvage, the allocation of the book reserve, and the reserve variance. It also shows the development of the remaining life accruals, in that the remaining life accrual is made up of two components, the normal whole life accrual plus the amortization of any reserve variance.

The following is an explanation of each column of the Schedule:

1. Column (1) presents the book balance for each account or subaccount at the indicated date.

2. Column (2) labeled "DISP TYPE" is a selected Iowa curve as discussed in the text.

3. Column (3) indicates the direct weighted average dollar service life in years for each investment group, except where Column (3) shows "Forecast", in which instance the life is a harmonically weighted average dollar service life. Another exception is any life which is a composite of two or more locations and/or two or more accounts (or subaccounts), in which case the composite life is a harmonically weighted composite life derived by dividing the sum of accruals for the group into the depreciable balance of Column (1).

4. Column (4) is the unadjusted whole life accrual rate developed by dividing unity by Column (3), and expressing the quotient as a percentage.

5. Column (5) is the whole life accrual with no salvage adjustment, based upon the average service life associated with each investment group. These accruals are developed by multiplying Column (1) by Column (4).

6. Column (6) is the percent net salvage expectation; net salvage equals gross salvage minus removal cost.

7. Column (7) is the salvage factor, derived by subtracting the (signed) net salvage ratio from unity; e.g., a salvage factor of 1.10 is the result of 1.00 minus an expected net salvage ratio of minus 0.10; i.e., 1.00 - (-0.10) = 1.10.

8. Column (8) is the whole life accrual rate, reflecting adjustment for net salvage expectations; it is developed by multiplying Column (4) by Column (7), and expressing the product as a percentage.

WHOLE LIFE SCHEDULE WITH RESERVE VARIANCE

EXPLANATORY NOTES

9. Column (9) is the whole life accrual, adjusted for net salvage expectations. It is developed by multiplying Column (8) by Column (1).

10. Column (10) shows indicated depreciation reserves, unadjusted for net salvage expectations, calculated on the basis of the average service life and dispersion characteristics (or forecasts) associated with each investment group.

11. Column (11) is the indicated depreciation reserve, adjusted for net salvage expectations by multiplying Column (10) by Column (7).

12. Column (12) "BOOK RSV. @12/31/16" contains book reserves allocated to accounts, or subaccounts from the functional book reserve level on the basis of the adjusted indicated reserves in Column (11). If book reserves are known and maintained at a finer level, or only at a larger level, these figures are used or allocated as appropriate.

13. Column (13) shows the difference between adjusted indicated reserves (Column 11) and allocated book reserves (Column 12); i.e., Column (11) minus Column (12).

14. Column (14), “COR RATE” is the cost of removal percent that is included in the accrual rate with net salvage.

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Schedule B

Comparison of Proposed vs. Current
Whole Life Depreciation Accrual Rates @ 12/31/16

FERC ACCOUNT NUMBER	DESCRIPTION	PLANT BALANCE @12/31/16	CURRENT ASL	CURRENT NET SALVAGE %	CURRENT ANNUAL ACCRUAL ACCRUAL RATES %	CURRENT ANNUAL DEPREC ACCRUAL	PROPOSED ASL	PROPOSED NET SALVAGE %	PROPOSED WHOLE LIFE DEPREC. ACCRUAL RATES	PROPOSED WHOLE LIFE ANNUAL DEPREC. ACCRUAL	DIFFERENCE BETWEEN PROPOSED AND CURRENT WHOLE LIFE ANNUAL ACCRUAL
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
303.00	CAPITALIZED SOFTWARE	14,745,889	7.0	0	14.29	2,107,188	6.2	0	16.13	2,378,512	271,324
	PRODUCTION PLANT										
305.00	STRUCTURES AND IMPROVEMENTS	1,975,163	30.0	0	3.33	65,773	35.0	0	2.86	56,490	-9,283
311.00	LP GAS EQUIPMENT	258,481	30.0	0	3.33	8,607	35.0	0	2.86	7,393	-1,215
320.00	OTHER EQUIPMENT-LNG	2,556,209	30.0	0	3.33	85,122	35.0	0	2.86	73,108	-12,014
320.10	OTHER EQUIPMENT-PRODUCTION	8,777,306	30.0	0	3.33	292,284	35.0	0	2.86	251,031	-41,253
	TOTAL DEPREC. PRODUCTION PLANT	13,567,159	30.0		3.33	451,786	35.0		2.86	388,021	-63,766
	STORAGE PLANT										
361.00	STRUCTURES AND IMPROVEMENTS-LNG	57,345	30.0	0	3.33	1,910	35.0	0	2.86	1,640	-270
363.50	OTHER EQUIPMENT-LNG	7,646	30.0	0	3.33	255	35.0	0	2.86	219	-36
	TOTAL DEPREC. STORAGE PLANT	64,991	30.0		3.33	2,164	35.0		2.86	1,859	-305
	TRANSMISSION PLANT										
366.20	STRUCTURES AND IMPROVEMENTS	269,809	30.0	0	3.33	8,985	35.0	0	2.86	7,717	-1,268
366.30	STRUCTURES AND IMPROVEMENTS-OTHER	353,851	30.0	0	3.33	11,783	35.0	0	2.86	10,120	-1,663
367.00	MAINS	234,672,697	60.0	-15	1.92	4,505,716	60.0	-15	1.92	4,505,716	0
369.00	MEASURING AND REGULATING STATION EQUIP.	4,909,208	30.0	0	3.33	163,477	35.0	0	2.86	140,403	-23,073
	TOTAL DEPREC. TRANSMISSION PLANT	240,205,565	58.6		1.95	4,689,960	59.0		1.94	4,663,956	-26,004
	DISTRIBUTION PLANT										
380.00	SERVICES	146,720,226	40.0	-60	4.00	5,868,809	45.0	-60	3.55	5,208,568	-660,241
381.00	METERS	14,628,345	35.0	0	2.86	418,371	32.0	0	3.13	457,867	39,497
381.10	METERS-INSTRUMENT	188,398	35.0	0	2.86	5,388	32.0	0	3.13	5,897	509
381.20	METERS-ERTS	5,647,769	35.0	0	2.86	161,526	15.0	0	6.67	376,706	215,180
382.00	METER INSTALLATIONS	14,360,005	35.0	0	2.86	410,696	32.0	0	3.13	449,468	38,772
387.00	OTHER EQUIPMENT	908,013	19.0	0	5.26	47,761	19.0	0	5.26	47,761	0
	TOTAL DEPREC. DISTRIBUTION PLANT	182,452,756	38.7		3.79	6,912,552	39.7		3.59	6,546,268	-366,284
	GENERAL PLANT										
390.00	STRUCTURES AND IMPROVEMENTS	22,070,702	30.0	0	3.33	734,954	35.0	0	2.86	631,222	-103,732
391.00	OFFICE FURNITURE AND EQUIP.	285,566	18.0	5	5.28	15,078	18.0	5	5.28	15,078	0
391.10	OFFICE FURNITURE AND EQUIP.-COMPUTERS	1,840,911	18.0	5	5.28	97,200	10.0	0	10.00	184,091	86,891
391.20	OFFICE FURNITURE AND EQUIP.-LAPTOP COMP.	679,916	18.0	5	5.28	35,900	5.0	0	20.00	135,983	100,084
393.00	STORES EQUIPMENT	99,421	30.0	0	3.33	3,311	30.0	0	3.33	3,311	0
394.00	TOOLS, SHOP & GARAGE EQUIPMENT	825,963	19.0	0	5.26	43,446	19.0	0	5.26	43,446	0
394.10	TOOLS, SHOP & GARAGE EQUIPMENT-CNG STATION	221,199	30.0	0	3.33	7,366	19.0	0	5.26	11,635	4,269
397.00	COMMUNICATION EQUIPMENT	443,965	15.0	0	6.67	29,612	10.0	0	10.00	44,397	14,784
398.00	MISCELLANEOUS GENERAL EQUIPMENT	348,302	15.0	0	6.67	23,232	15.0	0	6.67	23,232	0
	TOTAL DEPREC. GENERAL PLANT	26,815,945	26.9		3.69	990,098	24.5		4.07	1,092,394	102,296
	TOTAL DEPREC. GAS PLANT	477,852,305	38.6		3.17	15,153,749	38.1		3.15	15,071,009	-82,740
	AMORTIZED PLANT										
392	TRANSPORTATION EQUIPMENT	2,566,140	5.0	0	20.00	513,228	5.0	0	20.00	513,228	0
396	POWER OPERATED EQUIPMENT	491,943	5.0	0	20.00	98,389	5.0	0	20.00	98,389	0
	TOTAL AMORTIZED PLANT	3,058,083	5.0		20.00	611,617	5.0		20.00	611,617	0
	TOTAL DEPREC. & AMORTIZED GAS PLANT	480,910,388	37.1		3.28	15,765,365	36.6		3.26	15,682,626	-82,740
1211	OPI-STRUCTURES-RETAINED										
304/365	LAND & LAND RIGHTS	592,018									
389.00	GNL LAND & LAND RIGHTS	16,806									
1012	ARO	139,286									
	DIFF. IN ACCOUNT 367 & 380 BAL. VS PUC ANNUAL REPOI	8,352									
	TOTAL GAS PLANT IN SERVICE	481,666,850									

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Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

APPENDICES

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Appendix A

Prior Depreciation Study for Calendar 2006
Dated February 15, 2008
(Schedule A)

IORTH NATURAL GAS INC. D/B/A KEYSPAN ENERGY DELIVERY NEW

SCHEDULE A

SCHEDULE OF DEPRECIATION ACCRUAL RATES @12/31/06

/HOLE LIFE SCHEDULE WITH AMORTIZATION OF RESERVE VARIANC

ACCOUNT NUMBER	DESCRIPTION	PLANT BALANCE @12/31/06	DISP TYPE	ASL	ACCRUAL RATE W/O NET SALV.	ACCRUAL WITHOUT NET SALV.	NET SALV. %	SALV. FACTOR	ACCRUAL RATE W/ NET SALV.	ACCRUAL WITH NET SALV.	THEO. RSV. WITHOUT NET SALV.	THEO. RSV. WITH NET SALV.	ALLOC. BOOK RSV. @12/31/06	RESERVE VARIANCE	ARL	AMORT. OF RESERVE VARIANCE	ACCRUAL WITH AMORT.	ACCRUAL RATE W/ AMORT.	COR RATE
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	STRUCTURES																		
1308.1	PRODUCTION PLANT STRUCTURES	1,195,433	R 1.0	30.0	3.33	39,808	0	1.00	3.33	39,808	570,236	570,236	998,174	-427,938	15.7	-27,257	12,551	1.05	0.00%
1308.6	DISTRIBUTION SYSTEM STRUCTURES	544,322	R 1.0	30.0	3.33	18,126	0	1.00	3.33	18,126	232,677	232,677	330,557	-97,880	17.2	-5,691	12,435	2.28	0.00%
1308.7	GENERAL AND MISCELLANEOUS STRUCTURES	1,553,420	R 1.0	30.0	3.33	51,729	0	1.00	3.33	51,729	667,464	667,464	1,328,897	-661,433	17.1	-38,680	13,049	0.84	0.00%
	TOTAL DEPREC. STRUCTURES	3,293,175		30.0	3.33	109,663			3.33	109,663	1,470,377	1,470,377	2,657,628	-1,187,251		-71,628	38,035	1.15	
	PRODUCTION EQUIPMENT																		
1330	OTHER PRODUCTION EQUIPMENT	8,993,569	R 1.0	30.0	3.33	299,486	0	1.00	3.33	299,486	4,280,025	4,280,025	7,729,462	-3,449,437	15.7	-219,709	79,777	0.89	0.00%
	DISTRIBUTION EQUIPMENT																		
1356	MAINS	136,231,396	R 1.0	60.0	1.67	2,275,064	-15	1.15	1.92	2,615,643	22,625,286	26,019,079	38,926,629	-12,907,550	50.0	-258,151	2,357,492	1.73	0.25%
1358	PUMPING AND REGULATING EQUIPMENT	2,473,039	S 0.0	30.0	3.33	82,352	0	1.00	3.33	82,352	519,452	519,452	643,785	-124,333	23.7	-5,246	77,106	3.12	0.00%
1359	SERVICES	80,850,399	R 4.0	40.0	2.50	2,021,260	-70	1.70	4.25	3,436,142	22,397,617	38,075,949	22,789,274	15,286,675	28.9	528,951	3,965,093	4.90	1.75%
1360	CUSTOMERS' METERS AND INSTALLATIONS	21,192,242	R 2.5	35.0	2.86	606,098	0	1.00	2.86	606,098	5,168,818	5,168,818	10,698,386	-5,529,568	26.5	-208,663	397,435	1.88	0.00%
	TOTAL DEPREC. DISTRIBUTION EQUIPMENT	240,747,076		48.3	2.07	4,984,775			2.80	6,740,235	50,711,173	69,783,298	73,058,074	-3,274,776		56,891	6,797,126	2.82	
	GENERAL EQUIPMENT																		
1372.1	OFFICE EQUIPMENT	7,524,999	S 4.0	18.0	5.56	418,390	5	0.95	5.28	397,320	1,632,803	1,551,163	3,348,598	-1,797,435	14.1	-127,478	269,842	3.59	0.00%
1374	STORES EQUIPMENT	43,120	SQ	30.0	3.33	1,436	0	1.00	3.33	1,436	10,135	10,135	36,851	-26,716	22.9	-1,167	269	0.62	0.00%
1376	LABORATORY EQUIPMENT	368,637	S 5.0	16.0	6.25	23,040	0	1.00	6.25	23,040	211,157	211,157	368,637		FULLY DEPRECIATED				
1377	GENERAL TOOLS AND IMPLEMENTS	767,601	S 6.0	19.0	5.26	40,376	0	1.00	5.26	40,376	262,437	262,437	390,288	-127,851	12.5	-10,228	30,148	3.93	0.00%
1378	COMMUNICATION EQUIPMENT	364,639	R 3.0	15.0	6.67	24,321	0	1.00	6.67	24,321	81,319	81,319	171,101	-89,782	11.7	-7,674	16,647	4.57	0.00%
1379	MISCELLANEOUS GENERAL EQUIPMENT	107,360	S 5.0	15.0	6.67	7,161	0	1.00	6.67	7,161	45,922	45,922	96,953	-51,031	8.6	-5,934	1,227	1.14	0.00%
	TOTAL DEPREC. GENERAL EQUIPMENT	9,176,356		17.8	5.61	514,724			5.38	493,654	2,243,773	2,162,133	4,412,428	-2,092,815		-152,481	318,133	3.47	
	TOTAL DEPREC. GAS PLANT	262,210,176		44.4	2.25	5,908,647			2.91	7,643,037	58,705,348	77,695,833	87,857,592	-10,004,279		-386,927	7,233,071	2.76	
	LAND	608,402																	
	OPI STRUCTURES RETAINED	0											105,109						
1373	TRANSPORTATION EQUIPMENT	587,017											698,424						
1395	UNFINISHED CONSTRUCTION	9,472,009																	
1080K	ARO												-694,277						
1113K													-2,511,368						
1220K													-105,109						
1081K													117,481						
110AR													469,391						
	TOTAL GAS PLANT IN SERVICE	272,877,604											85,937,243						

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Appendix B

Approved Staff Depreciation Parameters

DG 08-009 (Energy North)
Depreciation and Amortization

Depreciation:	Balance at 6/30/07 [1]	Settlement Average Serv. Life	Net Salvage Rates	Dep. Accr. Rate	Dep. Expense [2]
308.1 Production Plant Structures	$ 1,251,458	30.0	0.0%	3.33%	$ 41,715
308.6 Distribution Plant Structures	$ 544,322	30.0	0.0%	3.33%	$ 18,144
308.7 General and Miscellaneous Structures	$ 2,248,237	30.0	0.0%	3.33%	$ 74,941
Total Structures	$ 4,044,017				$ 134,801
330 Other Production Equipment	$ 8,993,569	30.0	0.0%	3.33%	$ 299,786
356 Mains	$ 138,162,939	60.0	-15.0%	1.92%	$ 2,648,123
358 Pumping and Regulating Equipment	$ 2,542,007	30.0	0.0%	3.33%	$ 84,734
359 Services	$ 84,479,802	40.0	-60.0%	4.00%	$ 3,379,192
360 Customer's Meters and Installations	$ 21,558,883	35.0	0.0%	2.86%	$ 615,968
Total Distribution Equipment	$ 246,743,631				$ 6,728,017
372.1 Office Equipment	$ 7,274,205	18.0	5.0%	5.28%	$ 383,916
374 Stores Equipment	$ 42,012	30.0	0.0%	3.33%	$ 1,400
376 Laboratory Equipment	$ 285,262	16.0	0.0%	6.25%	FULLY DEP
377 General Tools and Implements	$ 767,601	19.0	0.0%	5.26%	$ 40,400
378 Communications Equipment	$ 361,674	15.0	0.0%	6.67%	$ 24,112
379 Miscellaneous General Equipment	$ 178,024	15.0	0.0%	6.67%	$ 11,868
Total General Equipment	$ 8,908,778				$ 461,697
Total Depreciation Expense	$ 268,689,995				$ 7,624,300
Amortization of Depreciation Reserve Surplus ($12,401,522)					$ (933,588)
Grand Total Depreciation and Amortization					$ 6,690,712

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Depreciation Accrual Rates Based on
Gas Plant in Service at December 31, 2016

Appendix C

List of FERC Accounts
Prior Depreciation Accrual Study
(Cross-referenced to PUC accounts)

Liberty Utilities (EnergyNorth Natural Gas) Corp.

Depreciation Study @12/31/2016

Utility Plant Account Mapping

DESCRIPTION OF PUC ACCOUNTS	DESCRIPTION OF FERC ACCOUNTS	DEPREC. STUDY @12/31/2006 PUC ACCOUNTS	DEPREC. STUDY @12/31/2006 PUC ACCOUNT BALANCES	DEPREC. STUDY @12/31/2006 FERC ACCOUNTS	DEPREC. STUDY @12/31/2006 FERC ACCOUNT BALANCES	DEPREC. STUDY @12/31/2016 FERC ACCOUNTS	DEPREC. STUDY @12/31/2016 ACCOUNT BALANCES
Prod. Plant Structures	Prod. Plant - Structs. & Improv.	1308.1	1,195,433	305.00	1,195,433	305.00	1,975,163
Distr. System Structures	Transm. Structs & Improv.	1308.6	544,322	366.02	230,981	366.20	269,809
	Transm. Structs & Improv.-Other			366.03	313,341	366.30	353,851
				TOTAL	544,322		623,660
Gnl & Misc. Structures	Gnl. Structs. & Improv.	1308.7	1,553,420	390.00	1,479,999	390.00	22,070,702
	Gnl. Structs. & Improv.-Leased			390.05	55,421	N/A	N/A
					1,535,420		
Other Prod. Equip.	Prod.-LP Gas Equipment	1330	8,993,569	311.00	207,767	311.00	258,481
	Prod.-Other Equipment-LNG			320.17	727,373	320.00	2,556,209
	Other Equipment-Prod.			320.18	7,772,238	320.10	8,777,306
	Storage-Structs. & Improv.-LNG			321.07	57,345	361.00	57,345
	Storage-Other Equipment-LNG			323.07	7.646	363.50	7,646
	Gnl-Tools, Shop & Gar. Equip-CNG Station			394.04	221,199	394.10	221,199
				TOTAL	8,993,568		11,878,216
Distr. Mains	Distr. Mains	1356	136,231,396	367.02	136,231,396	367.00	234,672,697

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Liberty Utilities (EnergyNorth Natural Gas) Corp.

Depreciation Study @12/31/2016

Utility Plant Account Mapping

DESCRIPTION OF PUC ACCOUNTS	DESCRIPTION OF FERC ACCOUNTS	DEPREC. STUDY @12/31/2006 PUC ACCOUNTS	DEPREC. STUDY @12/31/2006 PUC ACCOUNT BALANCES	DEPREC. STUDY @12/31/2006 FERC ACCOUNTS	DEPREC. STUDY @12/31/2006 FERC ACCOUNT BALANCES	DEPREC. STUDY @12/31/2016 FERC ACCOUNTS	DEPREC. STUDY @12/31/2016 ACCOUNT BALANCES
Pumping & Reg. Equip.	Meas. & Reg. Station Eq.	1358	2,473,039	369.00	2,473,039	369.00	4,909,208
Services	Services	1359	80,850,399	380.00	80,850,399	380.00	146,720,226
Customer's Meters & Install.	Meters	1360	21,192,242	381.00	10,880,759	381.00	14,628,345
	Meters-Instrument			381.01	98,530	381.10	188,398
	Meters-ERTS			381.02	5,028,696	381.20	5,647,769
	Meter Installations			382.00	5,184,258	382.00	14,360,005
				TOTAL	21,192,243		34,824,517
Gnl. Office Equipment	Capitalized Software	1372.1	7,524,999	303.01	5,842,671	303.00	14,745,889
	Gnl. Office Furn. & Equip.			391.00	150,501	391.00	285,566
	Gnl. Office Furn. & Equip.-Computers			391.03	1,530,737	391.10	1,840,911
	Gnl. Office Furn. & Equip.-Laptop Computers			391.07	1,090	391.20	679,916
				TOTAL	7,524,999		17,552,282
Gnl. Stores Equipment	Gnl. Stores Equipment	1374	43,120	393.00	43,120	393.00	99,421
Gnl. Laboratory Equipment	Gnl. Laboratory Equipment	1376	368,637	395.00	368,637	N/A	N/A
Gnl. Tools & Implements	Distr. Other	1377	767,601	387.00	453,514	387.00	908,013
	Gnl. Tools, Shop & Garage			394.00	314,087	394.00	825,963
				TOTAL	767,601		1,733,976
Gnl. Communication Equip.	Gnl. Communication Equip.	1378	364,639	397.00	364,639	397.00	443,965
Gnl. Misc. Equipment	Gnl. Misc. Equipment	1379	107,360	398.00	107,360	398.00	348,302