

**NORTHERN UTILITIES
NEW HAMPSHIRE DIVISION**

**SCHEDULE
PMN-2G-1**

**DISCUSSION OF
MARGINAL COST ANALYSIS
METHODOLOGIES**

The purpose of this supplemental testimony is to provide an explanation of the marginal cost study. The direct testimony, and PMN-2G-2, Marginal Cost Tables (1 through 14), are supplemented with this Schedule as well as a complete set of supporting workpapers. This Schedule PMN-2G-1 is intended to provide a more detailed explanation of the computational aspects of the marginal cost study than is briefly provided in my direct testimony.

This supplemental testimony addresses two topics as follows:

1. A discussion of the methods employed in the Marginal Cost Study to allocate delivery service revenue requirements among classes, and
2. The computation of design day demands necessary for the marginal cost study.

Marginal Cost Study

The marginal cost study details, presented as Schedule PMN-2G-2, consist of fourteen different tables and supporting calculations. The organization of the marginal cost study can be understood by referring to the attached flow chart (Figure 1). This flow chart shows the logical progression of data in the marginal cost study beginning with plant investment data and proceeding through to the development of marginal unit costs to serve. The summary output from the marginal cost study is shown on Table 14 of Schedule PMN-2G-2. This table and supporting detail show the results of the marginal cost study along with calculations leading to these results adjusted to the Company's delivery revenue requirements. These results are also included in the rate design, Schedule PMN-1G-8.

The flow chart that follows provides the discrete computations made in the marginal cost study. The first three tables comprising the first 9 pages of the marginal cost study develop the plant investment necessary to serve growth. Table 1 (Schedule PMN-2G-2) develops the investment in production plant necessary to serve an increment of customer load. Table 2 (Schedule PMN-2G-2) addresses the capacity-related distribution plant investments, while Table 3 (Schedule PMN-2G-2) addresses customer-related investments to the distribution system. Table 4 (Schedule PMN-2G-2) details the development of estimated marginal production O&M expenses, both commodity and capacity. Table 5 (Schedule PMN-2G-2) computes marginal distribution capacity-related O&M expenses. Table 6 (Schedule PMN-2G-2) estimates customer-related O&M expenses. Table 7 (Schedule PMN-2G-2) develops loading factors used to account for marginal costs not individually estimated, such as administrative and general expenses. Table 8 (Schedule PMN-2G-2) develops levelized fixed charge rates used to translate one-time capital investments into annual revenue requirements. Tables 9, 10, and 11 (Schedule PMN-2G-2) summarize the results of all calculations, depicting the quantification of marginal capacity, commodity, and customer-related costs, respectively.

MARGINAL COST STUDY

FLOWCHART

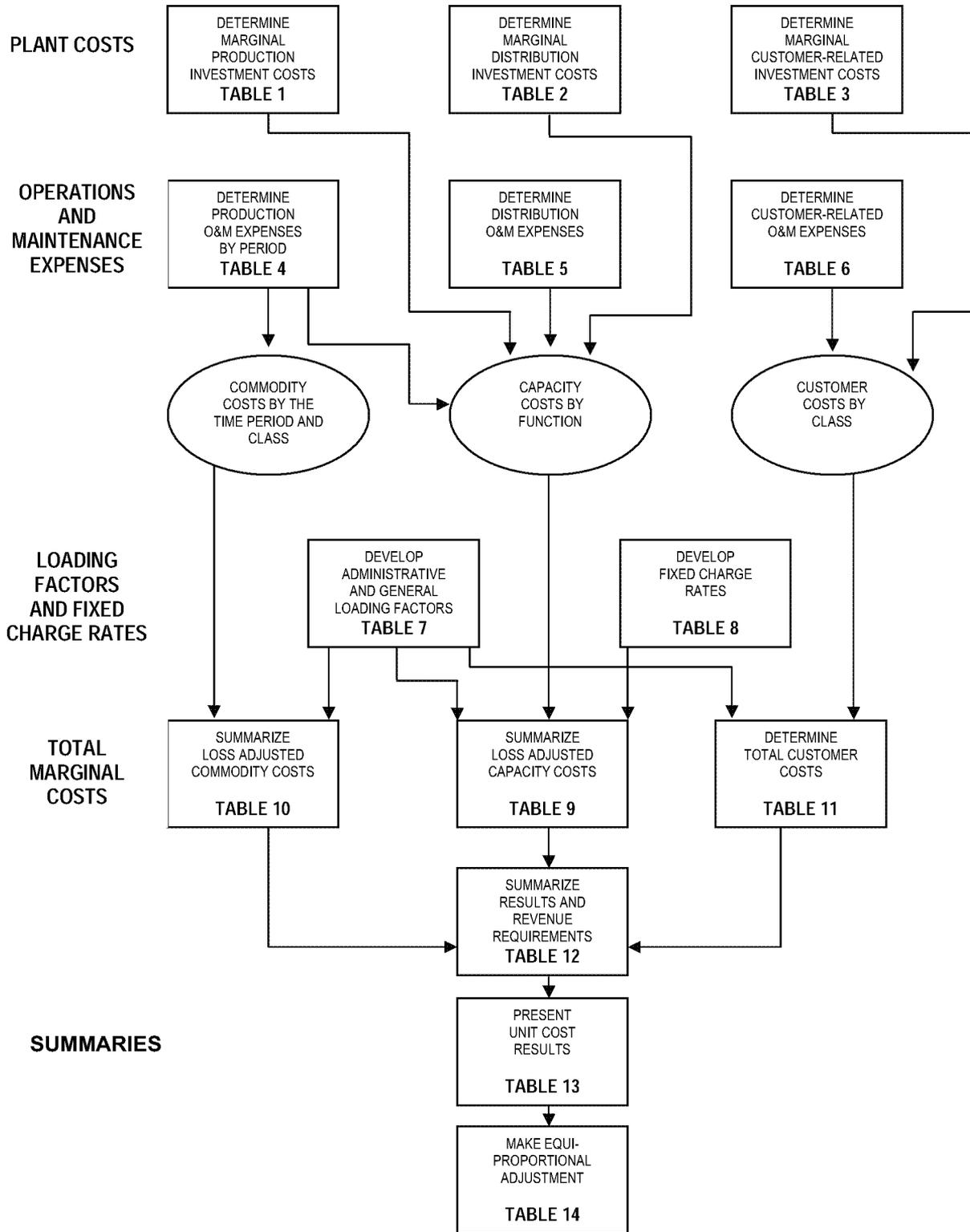


Table 12 (Schedule PMN-2G-2) summarizes the component costs from Tables 9, 10, and 11. Table 13 (Schedule PMN-2G-2) converts the total costs set forth on Table 12 into marginal unit costs. Finally, Table 14 (Schedule PMN-2G-2) adjusts the marginal costs for each class using the equi-proportional method so that the sum of the class adjusted marginal costs equals the proposed delivery system revenue requirement of \$20,968,864 identified on Schedule PMN-1G-2, page 5 of 7, line 12. These results are also provided in the rate design, Schedule PMN-1G-8.

Demand or capacity investments for gas distribution companies consist of production, transmission and distribution functions. Production capacity costs are the unitized costs of expanding the Company's production capability to meet a long-run increase in customers' requirements for gas service. Normally, when conducting a marginal cost study to determine delivery costs to serve, one would assume that all production costs, both capacity and commodity costs, fall into the category of supply costs and would be excluded from a study measuring only delivery costs. This is not always the case, but it is for Northern Utilities – NH.

Under most conditions, a small increase in customer demand will cause the Company to incur little or no additional cost. With few exceptions, the Company will meet any additional load with its existing supply sources. However, at some point the load increment will demand that the Company acquire additional sources of supply. In practice, a gas utility may expand its production capacity by increasing the amount of gas it may take under a firm contract from a supplier, by expanding

its storage capacity, or by increasing its ability to supply itself from on-system production facilities, such as an LP-air or an LNG vaporizer.

The marginal cost analysis presented in this filing utilizes the peaker method. In simple terms, the peaker method identifies the least capital intensive capacity source that can be added to the Company's resources to meet customer demand peaks of short duration.

The Company informed me that the current LNG facility (Maine) is used for supply purposes only, and that expansion would not be necessary for a substantial future period. I therefore assumed that all production capacity costs are zero as shown on Table 1 pages 1-3. This also assumes that the current infrastructure improvements will also eliminate the need for pressure support as a marginal cost in the foreseeable future.

Distribution capacity costs were computed in two pieces - the long-run marginal costs of adding main extensions to serve new load and the long-run marginal costs of reinforcing the existing gas distribution system to support the existing and additional loads to be expected.

Table 2 of Schedule PMN-2G-2, consisting of pages 1 through 5, develops my estimate of the costs to expand the distribution system. My approach, identified as the "Main Extensions and System Reinforcement" method is detailed on pages 3 and 4. Page 4 develops an estimate of the anticipated unit cost of additional main extensions based on an analysis of historical main extension footage, load, and cost. However, load growth places additional load on the Company's existing

distribution system and requires reinforcement of that system. Page 3 shows a 10-year, forward-looking distribution system estimate of the costs of system reinforcements. The cost of reinforcements was estimated using the incremental cost to reinforce the remainder of the distribution system and the expected load growth served by these additions.

Table 4, page 1, typically calculates marginal commodity costs. But, because this study is used only to establish (allocate) distribution delivery revenue requirements (Table 14), the only costs estimated on this table are the production expenses associated with transportation as shown on Table 4, page 2. As I previously identified, 100.0% of the production capacity is supply related, therefore 0.0% of the production expenses are allocated to the distribution function in this study.

The calculation of capacity-related component of Distribution O&M expenses is shown on Table 5 consisting of two pages. I reviewed distribution O&M expenses account by account for the historical period. I directly assigned Meter Operating Labor & Expense, Maintenance of Services & Maintenance of Customer's Meters all to the customer component. I then pro-rated accounts 852, 856, 874, to the customer and capacity components in proportion to mains and service investment. I also pro-rated accounts 850, 859, 870, 880, 881, 885, and 894 to customer and capacity components. The customer and capacity allocation was accomplished by using the total customer/capacity expense to total T&D expense less the sum of the aforementioned accounts.

On Table 5 of Schedule PMN-2G-2, I restated the annual capacity-related expenses in terms of current cost, indexing by the GDP Implicit Price Deflator, to determine capacity-related O&M expenses in current dollars. The regression using design day demand as an independent variable approximated the current marginal cost. I have employed the regression results of marginal investment per design day terms as the best estimate of future marginal costs.

The development of marginal capacity costs is shown on Schedule PMN-2G-2, Table 9. This table develops marginal capacity costs by function. Plant investments identified in Tables 1 and 2 are grossed up to include general plant. Applying the fixed charge rates annualizes these investments. To this amount, annual operating expenses are added, including an allowance for A&G expenses. An adjustment reflecting annual revenue requirements to finance working capital is added. Next, the indicated unit costs were increased to reflect unaccounted for losses experienced. Finally, these costs were escalated from test year to rate year levels.

Marginal customer costs are summarized on Schedule PMN-2G-2, Table 11. The long-run marginal costs of serving an additional customer were determined to be a function of the size of the customer and the class of service. Three different customer costs were computed, representing the costs of connecting and serving a customer for each of the Company's rate categories. These customer costs consist of:

- (1) Plant investment in services and meters,
- (2) Related operations and maintenance expenses, and
- (3) Billing costs such as customer accounting and customer information expenses.

The computation of customer-related plant investment began with services, as shown on Table 3. These are typical estimates for service construction costs new for each customer class and then adjusted these estimates by the services-per-customer ratio.

Meter investment was developed from current meter cost data. Recent cost accounting data provided the current installation costs and regulator costs, which were applied as a percentage adder to meter investment.

The computation of customer-related operations and maintenance expenses are summarized on Table 6, consisting of five pages. On page 1, customer-related distribution O&M expenses previously identified on Table 5 were restated in current dollars, using the GDP Implicit Price Deflator as a cost index. Because the regression equation did not appear to be a reasonable predictor of customer related expenses the average deflated cost per customer from 2005 through 2010 was used as the marginal customer costs. Page 2 of Table 6 shows the allocation of costs to customer classes, based on the services and meters investments required.

Page 3 of Table 6 shows the development of customer accounting and marketing services expenses. In general, the number of customers has been increasing, while these customer-related expenses have been roughly keeping

pace. However, no valid statistical correlation was demonstrated. Due to accounting changes in 2009 marketing expenses in accounts 911, 912, 913, and 916 are booked elsewhere. Also account 908 started being used in 2008 and increased substantially until 2010. Due to these circumstances the average unit cost for the period 2005 to 2010 was chosen as a proxy for the average marginal customer accounting and marketing costs. The cost was assumed to be equal for all customer classes.

The customer charges shown on page 4 of Table 6 specifically exclude uncollectible accounts expense. A separate analysis of the uncollectible costs is shown on page 5 of Table 6. The actual write-off experience by rate class for the test year has been adjusted on a pro rata basis to reflect the average write-off rate of 0.91% developed from account 904 w/ gas related items removed as a percent of delivery revenues by class.

Schedule PMN-2G-2, Table 7, develops loading factors used in the marginal cost study. Loading factors are used to compute estimates of marginal costs where direct quantification is either too complex or the costs are insignificant. In the former category, administrative and general expenses are only indirectly related to customer load characteristics. To simplify quantification of marginal costs, A&G costs are related to other O&M expenses or plant-related items.

Losses are calculated by the company, and are used on Tables 9 and 10 of Schedule PMN-2G-2. Table 7 also develops 5-year average loading factors for

Materials and Supplies and Prepayments, and General Plant. This period was chosen in order to accurately reflect recent trends.

The development of the carrying charge rates is shown in Schedule PMN-2G-2, Table 8. These pages detail the development of the levelized fixed charged rates for peaking production facilities, capacity-related distribution plant and customer-related distribution plant. These rates are used to convert one-time investments into annualized revenue requirements, necessary for pricing. For rate-making purposes, utility investments in fixed plant are normally treated as rate base items. Utility rates are established periodically to allow the recovery of costs incurred in ownership, including such items as return, taxes, depreciation, etc. Rather than deal with an irregular set of annual costs stemming from ownership of assets, levelized fixed charge rates compute the present worth of all revenue requirements stemming from utility ownership of an asset, and then provide an equivalent annual payment stream of identical present worth.

The development of a levelized fixed charge rate applicable to Production plant investment is shown on pages 2, 3 and 7(Not Used). The calculations for capacity-related distribution plant (pages 2, 4, and 8), services (pages 2, 5 and 9), and metering investment (pages 2, 6 and 10) are similar. For simplicity, I will only discuss the calculation of the capacity-related distribution carrying charge rate.

Page 2 of Table 8 of Schedule PMN-2G-2 shows the input assumptions used to develop levelized fixed charge rates. A hypothetical investment of \$1,000 is used for demonstration purposes. Table 8, page 11, shows the development of weighted

average service lives and salvage values used as input into the computations. Using current property tax rates and incremental income tax rates, the calculation of annual utility revenue requirements stemming from the initial \$1,000 investment is shown on page 8 of Table 8.

Table 8 displays two different fixed charge rates -- the "engineer's" and "economist's" fixed charge rates. The "engineer's" fixed charge rate is akin to a banker's conventional fixed rate mortgage. It represents a percentage of the original investment that must be made in current year dollars, in order to equate to the present worth of the utility's revenue requirements. The "economist's" fixed charge rate differs slightly, in that it assumes that payments will escalate each year by the rate of inflation. Inherent in the engineer's fixed charge rate is the assumption that an asset is depleted more rapidly at the outset than toward the end of its service life. The economist's fixed charge rates make the opposite assumption -- that an asset's utility at the beginning of its service life is equal to its value at the end of its service life. In the gas utility industry, old plant is nearly as useful as new plant. As an example, meters provide the same service at the beginning of their lives as they do at their end. Consequently, the economist's fixed charge rate was used to convert one-time plant investments into annual revenue requirements.

Schedule PMN-2G-2, Table 12, tabulates the long-run marginal costs computed on Tables 9 through 11. In addition, Table 12 calculates the revenues that would be generated if the Company were to introduce full marginal cost-based pricing and if customers were to continue to consume on the basis of the demands

that they are expected to produce on a design day. Obviously, it is impossible to implement such pricing because the revenues generated would not achieve the Company's claimed revenue requirement. The last line on this page shows the monthly revenue requirements that each customer class should provide based upon historical consumption. This summary is presented for all customers receiving firm delivery services. It is important to note that the marginal costs for delivery service consist entirely of fixed costs and fall into two categories: those that vary in the long run with the number of customers in a class and those that vary in the long run with the distribution system capacity needed to serve aggregate class design day demands. None of the costs vary in the short run and none vary with sales volumes. Unfortunately, it is impractical to attempt to price customer consumption on the basis of their anticipated design day demand.

Table 13 of Schedule PMN-2G-2 derives unit costs based on billed sales in the winter and summer months, even though these costs do not vary on the basis of therm sales. Seasonal revenue requirements were divided by seasonal sales to derive unit costs.

Finally, Table 14 of Schedule PMN-2G-2 adjusts the calculated marginal costs from Table 13 to the Company's total revenue requirement. The equi-proportional method is used as the most appropriate approach to reconcile any revenue deficiencies. Under this method, all marginal costs are adjusted by a uniform percentage to match the Company's total test year delivery revenue requirements. The unit costs shown at the bottom of this schedule represent the optimal prices if rates were constrained to customer charges and therm (CCF)

charges, as they have in the past. It shows that delivery service is free in the summer and that all marginal capacity costs should be recovered in the winter. A closer scrutiny of the data reveals that all marginal costs are incurred to serve design day demand, and a truly optimal rate design would bill customers an amount designed to recover their marginal costs to serve. These costs are summarized on Table 14 and reflect the total marginal facilities charge on a monthly basis.

Design Day Demand Estimates

Design Day demand estimates were employed in the development of costs for the accounting and the marginal cost studies. Design day demands represent the largest daily load for which the utility intends to provide reliable service and for which it designs its system. From a practical standpoint, design day demands can be interpreted as the load expected on the coldest anticipated day. Design day demand estimates play an essential role in gas utility planning and in determining cost responsibilities in this filing. The design day demand estimates for each customer class were employed in the marginal cost study to establish forward looking cost responsibilities. The class design day estimates were also employed in the development of allocation factors for capacity related costs such as the costs of mains, pressure stations, and storage, in the accounting cost of service study.

Since design day temperatures occur so infrequently, natural gas distribution companies such as Northern Utilities have limited data upon which to measure aggregate system design day demands and, because customer consumption is metered monthly, the company has no daily demand data at the rate class level.

Therefore, this demand measure and the rate class allocation must be estimated. In order to insure reasonable estimates, I selected the best estimate using two alternative methods. The first method is called the "Regression Method" and is the preferred method when the regressions are sufficiently robust. Under this approach, the monthly sales data is deemed the independent variable and regressed against the degree days ("DDs") in the customer's billing cycle. Using conventional Least Squares Fit regression techniques, the data is used to generate an equation of the form:

$$Y = a + bX$$

Where "a" is the Y-intercept and is interpreted as the customer's base use in the absence of any heating load

and

Where "b" is the slope of the equation and represents the customer's heating increment, i.e., the customer's additional use in therms per degree day.

When a valid regression was established the class load was estimated using the Company's planning criteria, to be able to provide firm service up to 79 heating degree days. The regression method was employed whenever the statistical analysis revealed a high degree of correlation as measured by the value of R-Squared, a "goodness of fit" statistic.

The second method is called the Peak Month Average Use Method. In this method the design day for the class is calculated as the average daily use for the class during the peak month for the G-42, G-50, T-51, and T-42 classes.

Schedule PMN-2G-2
Marginal Cost Study
Northern Utilities – New Hampshire
Docket DG 11-069

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Table - 1
Northern Utilities- New Hampshire
Marginal Cost Study

Production Investment Summary-Modified Peaker

Line No.	Description (1)	Company Total (2)
	COST FOR REINFORCEMENT	
1		
2	Current Cost of Capacity Expansion	{1} \$0.00
3		
4		
5		
6	First Year of Capacity Shortfall	{2} 2027
7		
8		
9	Base year of study	2010
10		
11		
12	Years Before Additions	(6)-(9) 17
13		
14	After Tax Cost of Capital	{3} 6.29%
15	Inflation Rate	{6} 2.30%
16		3.99%
17		
18		
19	Present Worth of Capacity Cost	
20	$(2)*[1+(15)]^{(12)}/[1+(14)]^{(12)}$	{4} \$0.00
21		
22	Percentage Related to Transportation	{5} 0.0%
23		
24	Transportation Related Investment	(20)*(22) <u>\$0.00</u>
25		
26	Gas Supply Related Plant Investment	(20)*[1-(22)] <u>\$0.00</u>

NOTES:

- 1 Source: Table - 1, page 2.
- 2 Source: Prior Study
- 3 Source: Table - 8, page 1.
- 4 Cost in today's dollars sufficient to purchase the designated unit in the first year of capacity shortfall allowing for interest and price escalation.
- 5 Source: Table - 1, page 3.
- 6 Inflation Net of Technical Progress

Table - 1
Northern Utilities- New Hampshire
Marginal Cost Study

Development of Marginal Production Plant Investment

Line No.	Description	Costs
	(1)	(2)
1	CONSTRUCTION OF PROPANE PROJECT ALTERNATIVE FACILITY	
2		
3	Addition of a New Facility: {1}	
4	Storage Tanks	
5	Refrigeration Systems	
6	Delivery Systems	
7	Air Deliver Systems	
8	Air Metering & Regulating (M&R) Station	
9	Pipeline Connection to Project	
10	Pipeline Connection from Project	
11	Land Costs	
12	Indirect Costs	0
13	Total Direct Costs	\$0
14	KeySpan Overhead	0
15	Total Capital Costs	\$0
16	O&M Costs	0
17	Total Project Costs	\$0
18	Price escalation {2} 2.3% 2 years	4.7%
19		
20	Cost of Facility (17)*[1+(18)]	\$0
21		
22	Total Project Capacity {1}	25,200
23		
24	Unit Cost of Expansion (20)/(22)	\$0.00
25		
26	Estimated Reserves for Supplemental Capacity {3}	0%
27		
28	Adj Cost of Production Capacity, \$/Therm (24)*[1+(26)]	<u>\$0.00</u>
29		
30	Percent Transportation-related {4}	0.0%
31		
32	Distribution related (28)*(30)	\$0.00
33	Production related (28)-(32)	\$0.00

NOTES:

- 1
- 2
- 3

Table - 1
Northern Utilities- New Hampshire
Marginal Cost Study

Development of Distribution-related Production Plant Investment

Line No.	Plant Name	Location	Type	Rating, mscfg	Heat Rate	Hours per Day	Design Day Therms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Capacity of Down Stream Assets			{1}			
2							
3				#DIV/0!	-	-	-
5				#DIV/0!	-	-	-
6				#DIV/0!	-	-	-
7				#DIV/0!	-	-	-
8				#DIV/0!	-	-	-
9				#DIV/0!	-	-	-
10	Total			#DIV/0!	#DIV/0!		0
11							
12	Production Requirements in lieu of Distribution investments						
13	Output Required for Pressure Support						
14							
15				{2}			
16					0	0	0
17		Total		0			0
18							
19							
20	Production Allocated to Pressure Support Function				(17)/(10)	0.0%	
21							
22	Production Allocated to Supply Function				100%-(20)	100.0%	

NOTES:

- 1 Source: Company Distribution Engineering personnel.
- 2

Table - 2
Northern Utilities- New Hampshire
Marginal Cost Study

Summary of Estimates for Distribution Capacity Cost

Line No.	Description	Quantity
	(1)	(2)
1		
2	PROSPECTIVE ADDITIONS	
3	REINFORCEMENT (From Stoner Analysis) {1}	
4	Estimate of upgrades	
5	to existing facilities.	\$2,213,750
6	Estimated Additional Load, Therm/Design Day	288,962
7	Average Cost for Upgrades (5)/(6)	\$7.66
8	Trended Cost for Upgrades {1}	\$7.66
9		
10	NEW MAIN EXTENSIONS	
11	Unit Cost for New Main Extensions {2}	\$72.58
12		
13	UNIT COSTS	
14	Unit Costs per Design Day Therm for Prospective Additions (8) + (11)	<u>\$80.24</u>
15		
16	ALTERNATE ANALYSES	
17	A - HISTORICAL INVESTMENTS {3}	
18	CAPACITY INCREMENT - 1988 to 2010	
19	2010 Design Day Sendout	569,539
20	1996 Design Day Sendout	519,260
21	Increase in Design Day Sendout (22)-(21)	50,279
22		
23	PLANT INVESTMENTS	
24	Investments to Increase Capacity, Current \$'s	
25	Total Investment 1989 2010	24,320,568
26		
27	UNIT COST	
28	Avg Unit Cost for Historical Investments (27)/(23)	<u>\$483.71</u>
29		
30		
31	B - TRENDED COST APPROXIMATION {4}	
32	Trended Cost Approximation (Slope of	
33	Regression Line)	<u>\$93.87</u>

34 For purposes of further study, assume long run marginal
35 costs will be estimated by prospective additions, line (14). \$80.24 /Design Day Therms
36

NOTES:

- 1 Source: Table - 2, Page 3.
- 2 Source: Table - 2, Page 4.
- 3 Source: Cost data from Table - 2, Page 2.
- 4 Source: Table - 2, Page 5.

Table - 2
Northern Utilities- New Hampshire

Historical Plant Investment Data - Capacity-Related

Line No.	Description	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
	DISTRIBUTION INVESTMENT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	PLANT BALANCES												
1	375- Distribution Structures	\$0	\$1,907,261	\$1,946,802	\$1,970,765	\$1,977,191	\$2,011,929	\$2,078,973	\$2,092,137	\$2,100,422	\$2,172,031	\$2,203,295	\$2,257,157
2	376- Mains	9,396,338	10,797,337	12,353,883	15,264,009	19,514,509	22,527,044	24,376,933	27,050,294	30,884,264	36,225,118	37,568,970	39,178,319
3	378- Distribution M&R Equip	295,732	345,623	421,515	544,570	587,436	672,030	736,918	857,679	938,019	1,051,946	1,137,147	1,195,858
4	382- Meter Installations	1,408,166	1,548,984	1,797,248	2,190,979	2,582,968	2,860,471	3,138,624	3,531,975	3,855,111	4,161,512	4,583,446	4,996,024
5	383- Dist House Regulators	0	0	0	0	0	0	0	0	0	0	0	0
6	386- Dist. Wtr Htr & Conv. Brn	156,516	207,275	378,308	653,700	1,048,110	1,342,183	1,657,512	1,865,584	1,953,335	2,139,929	3,359,028	3,377,491
7	Net Capacity-related												
8	Distribution Plant												
9	Balances Sum (1) thru (6)	11,256,752	14,806,481	16,897,757	20,624,023	25,710,215	29,413,657	31,988,960	35,397,669	39,731,151	45,750,536	48,851,887	51,004,849
10													
11	Net Plant Additions {2}		3,549,728	2,091,276	3,726,267	5,086,192	3,703,442	2,575,303	3,408,709	4,333,482	6,019,386	3,101,350	2,152,962
12													
13													
14	Handy-Whitman - Jan 1 {3}	247	261	277	283	294	296	307	313	319	325	333	341
15	Index - Mains - Jul 1 {3}	247	261	280	289	299	302	310	315	322	330	337	344
16	Wtd. Avg. Annual Index	250.50	265.00	280.00	288.75	297.00	301.75	310.00	315.50	322.00	329.50	337.00	343.75
17	(14i)/4+(15i)/2+(14j)/4												
18													
19	Current Cost of Additions												
20	(11)*(16)/Current Index	\$0	\$6,724,391	\$3,749,359	\$6,478,219	\$8,596,863	\$6,161,153	\$4,170,329	\$5,423,684	\$6,755,925	\$9,170,657	\$4,619,816	\$3,144,107
21													
22	Cumulative Net Additions	0	6,724,391	10,473,750	16,951,969	25,548,832	31,709,985	35,880,314	41,303,997	48,059,922	57,230,579	61,850,395	64,994,502
23													
24	Correction Factor for Replm'ts {2}	23.2%											
25													
26	Cum Growth Related Invest	0	1,557,516	2,425,949	3,926,446	5,917,667	7,344,725	8,310,664	9,566,908	11,131,728	13,255,852	14,325,902	15,054,146

NOTES:

- 1 Source: Annual Reports
- 2 Source: Table 2 page 5
- 3 Hand-Whitman for Plastic Mains

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Table - 2
Northern Utilities- New Hampshire
Marginal Cost Study

Historical Plant Investment Data - Capacity-Related

Line No.	Description	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	DISTRIBUTION INVESTMENT	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)		
	PLANT BALANCES												
1	375- Distribution Structures	\$2,259,457	\$2,259,457	\$2,235,888	\$2,250,950	\$2,250,950	\$2,295,667	\$2,295,667	\$2,332,194	\$2,332,194	\$2,332,194	\$2,334,042	\$2,820,320
2	376- Mains	40,532,171	42,573,536	43,946,403	45,608,517	47,288,473	49,392,846	50,531,680	54,591,098	57,186,366	59,131,775	59,604,088	65,458,022
3	378- Distribution M&R Equip	1,262,572	1,397,118	1,449,677	1,467,946	1,553,479	1,611,260	1,636,689	1,744,560	1,770,112	1,770,112	1,770,570	1,787,578
4	382- Meter Installations	5,445,660	5,767,414	6,202,545	6,771,415	7,315,947	7,771,080	8,360,751	9,196,256	9,814,274	10,622,593	10,703,831	12,313,745
5	383- Dist House Regulators	6,776	10,520	43,097	86,332	118,546	158,413	185,195	185,195	185,195	185,195	185,195	222,731
6	386- Dist. Wtr Htr & Conv. Brn	3,425,650	3,520,935	3,497,800	3,538,176	3,589,462	3,052,832	2,868,870	2,307,938	2,362,713	2,444,161	2,447,385	2,523,018
7	Net Capacity-related												
8	Distribution Plant												
9	Balances Sum (1) thru (6)	52,932,285	55,528,980	57,375,410	59,723,337	62,116,857	64,282,099	65,878,851	70,357,241	73,650,854	76,486,030	77,045,113	85,125,415
10													
11	Net Plant Additions {2}	1,927,436	2,596,695	1,846,430	2,347,927	2,393,520	2,165,242	1,596,753	4,478,390	3,293,613	2,835,176	559,083	8,080,302
12													
13													
14	Handy-Whitman - Jan 1 {3}	346	354	364	369	376	389	411	433	460	480	514	502
15	Index - Mains - Jul 1 {3}	351	357	367	376	379	394	421	440	465	486	516	502
16	Wtd. Avg. Annual Index	350.50	358.00	366.75	374.25	380.75	397.00	421.50	443.25	467.50	491.50	512.00	502.00
17	(14i)/4+(15i)/2+(14j)/4												
18													
19	Current Cost of Additions												
20	(11)*(16)/Current Index	\$2,760,551	\$3,641,176	\$2,527,356	\$3,149,390	\$3,155,738	\$2,737,913	\$1,901,708	\$5,071,972	\$3,536,671	\$2,895,744	\$548,163	\$8,080,302
21													
22	Cumulative Net Additions	67,755,053	71,396,229	73,923,585	77,072,975	80,228,713	82,966,625	84,868,333	89,940,305	93,476,976	96,372,721	96,920,884	105,001,186
23													
24	Correction Factor for Replm'ts {2}												
25													
26	Cum Growth Related Invest	15,693,550	16,536,926	17,122,317	17,851,784	18,582,722	19,216,882	19,657,360	20,832,139	21,651,309	22,322,027	22,448,993	24,320,568

NOTES:

- 1 Source: Annual Reports
- 2 Source: Table 2 page 5
- 3 Hand-Whitman for Plastic Mains

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Table - 2
Northern Utilities- New Hampshire
Marginal Cost Study

Development of Capacity Related Investment - Distribution Reinforcement

Line No.	Year	Peak Vol	Reinf Cost Current \$	Reinf Cost Constant \$	Cumulative Total
	(1)	(2)		(3)	(4)
1	INVESTMENT FOR REINFORCEMENT	{1}{3}			
2	2011	1,468,787		1,935,000	1,935,000
3	2012	1,505,034		0	1,935,000
4	2013	1,534,477		0	1,935,000
5	2014	1,564,510		0	1,935,000
6	2015	1,595,144		0	1,935,000
7	2016	1,626,390		300,000	2,235,000
8	2017	1,658,261		0	2,235,000
9	2018	1,690,769		0	2,235,000
10	2019	1,723,928		1,913,750	4,148,750
11	2020	1,757,749		0	4,148,750
12					
13					
14	Total Reinforcement Cost	288,962		\$2,213,750	
15					
16					
17	REGRESSION RESULTS			<u>Cum Invest Col. (4) vs Peak Vol Col. (2)</u>	
18	Slope			8.8	
19	Y Intercept			(11,739,197)	
20	Coefficient of Determination (RSQR)			66.42%	
21	t-value			3.7	
22					
23	Regression Estimate	(18)		\$8.76	
24					
25	Incremental Average Cost	(14), col. (3) / col. (2)		\$7.66	
26					
27	UNIT COSTS FOR REINFORCEMENT				
28	\$'s per Design Day Therms	{3}		<u>\$7.66</u>	

NOTES:

- 1 Baseline forecast used to develop marginal distribution investment taken from engineer's estimates.
- 2 Results of Stoner model which identifies pressure problems on design hours. Areas with identified pressure deficiencies are reinforced, based on engineer's assessment of needed improvements. All such cost estimates based on test year costs.
- 3 Regression results are insufficiently robust to support the estimate of marginal costs. The incremental average cost was used for Marginal Cost.

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Table - 2
Northern Utilities- New Hampshire
Marginal Cost Study

Development of Distribution Main Extension Investment

Line No.	Year	Installed Footage	Cumulative Footage	Cost	Cost per Foot	Cost Index	Costs in 2010 \$'s	Costs Per Foot	Cum Investm't	Design Day Demand
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		{1}		{2}	(4)/(1)	{3}	(6)/(5)	(6)/(1)		
1	1988	16,390								
2	1989	11,838	11,838	240,170	\$20.29	1.793	430,590	\$36.37	430,590	0
3	1990	22,623	34,461	247,615	\$10.95	1.739	430,486	\$19.03	861,076	0
4	1991	26,544	61,005	501,905	\$18.91	1.690	848,338	\$31.96	1,709,414	0
5	1992	23,224	84,229	727,250	\$31.31	1.664	1,209,873	\$52.10	2,919,287	0
6	1993	10,953	95,182	459,663	\$41.97	1.619	744,357	\$67.96	3,663,645	0
7	1994	18,744	113,926	338,540	\$18.06	1.591	538,659	\$28.74	4,202,304	0
8	1995	19,362	133,288	472,382	\$24.40	1.559	736,446	\$38.04	4,938,750	0
9	1996	20,071	153,359	661,359	\$32.95	1.524	1,007,594	\$50.20	5,946,344	519,260
10	1997	13,226	166,585	722,482	\$54.63	1.490	1,076,219	\$81.37	7,022,563	534,600
11	1998	10,551	177,136	486,009	\$46.06	1.460	709,749	\$67.27	7,732,313	541,340
12	1999	14,155	191,291	303,980	\$21.47	1.432	435,372	\$30.76	8,167,685	525,529
13	2000	12,205	203,495	402,888	\$33.01	1.402	564,944	\$46.29	8,732,629	520,249
14	2001	8,858	212,353	338,004	\$38.16	1.369	462,652	\$52.23	9,195,281	517,753
15	2002	5,178	217,531	317,408	\$61.30	1.341	425,754	\$82.23	9,621,036	528,031
16	2003	5,719	223,250	276,364	\$48.33	1.318	364,373	\$63.72	9,985,408	538,347
17	2004	10,312	233,561	226,109	\$21.93	1.264	285,912	\$27.73	10,271,320	567,560
18	2005	8,709	242,271	373,000	\$42.83	1.191	444,237	\$51.01	10,715,557	545,734
19	2006	12,310	254,580	379,781	\$30.85	1.133	430,119	\$34.94	11,145,675	512,792
20	2007	6,682	261,262	594,114	\$88.91	1.074	637,957	\$95.48	11,783,633	571,784
21	2008	8,611	269,873	372,119	\$43.21	1.021	380,068	\$44.14	12,163,701	582,530
22	2009	3,211	273,085	483,155	\$150.45	0.980	473,718	\$147.51	12,637,419	565,572
23	2010	0	273,085	316,309		1.000	316,309		12,953,729	569,539
24										
25	Totals	286,264		8,441,140	\$29.49		12,163,701	\$42.49		
26										
27	REGRESSION RESULTS									
28										
29	Slope									
30	Y Intercept									
31	Coefficient of Determination (RSQR)									
32	t Statistic									
33										
34										
35	Trended Cost Per Design Day Therms									
36										
37	MARGINAL COST ESTIMATES									
38										
39	Trended Cost Per Design Day Therms		(27)*(28)		\$61.60					
40										
41	Average Cost Per Design Day Therms									
42	1996-2010				\$139.37					
43	2001-2010				\$72.58					
44	2005-2010				\$94.02					
45	Marginal Cost for Main Additions			{4}	\$72.58					

NOTES:

- 1 Source: Total annual new footage installed less footage retired from accounting records.
- 2 Source: Plant accounting records.
- 3 Source: Handy Whitman Index of Plastic Mains
- 4 Regression results are insufficiently robust to support the estimate of marginal costs. Since 2009 and 2010 installed footage is peculiar

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Table - 2
Northern Utilities- New Hampshire
Marginal Cost Study

Regression Analysis of Distribution Capacity Costs

Line No.	Year	Total Mains Investment (2008 \$)	Mains Investment for Growth (2008 \$)	Ratio	Total Capacity Related Net Distribution Investment	Growth Related Distribution Investment	Cumulative Investment	Design Day Sendout
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		{1}	{2}	{2}/{1}	{3} {4}	{3}*{4}		
1	1989	2,790,664	430,590	15%	3,749,359	578,514	578,514	0
2	1990	5,059,336	430,486	9%	6,478,219	551,215	1,129,729	0
3	1991	7,184,348	848,338	12%	8,596,863	1,015,129	2,144,858	0
4	1992	5,011,739	1,209,873	24%	6,161,153	1,487,351	3,632,210	0
5	1993	3,126,749	744,357	24%	4,170,329	992,793	4,625,003	0
6	1994	4,253,653	538,659	13%	5,423,684	686,825	5,311,828	0
7	1995	5,977,182	736,446	12%	6,755,925	832,395	6,144,223	0
8	1996	8,136,900	1,007,594	12%	9,170,657	1,135,604	7,279,827	519,260
9	1997	2,001,821	1,076,219	54%	4,619,816	2,483,706	9,763,533	534,600
10	1998	2,350,235	709,749	30%	3,144,107	949,491	10,713,025	541,340
11	1999	1,939,040	435,372	22%	2,760,551	619,825	11,332,850	525,529
12	2000	2,862,472	564,944	20%	3,641,176	718,631	12,051,481	520,249
13	2001	1,879,153	462,652	25%	2,527,356	622,242	12,673,722	517,753
14	2002	2,275,068	425,754	19%	3,149,390	589,374	13,263,097	528,031
15	2003	2,214,938	364,373	16%	3,155,738	519,141	13,782,237	538,347
16	2004	2,660,946	285,912	11%	2,737,913	294,181	14,076,419	567,560
17	2005	1,356,333	444,237	33%	1,901,708	622,862	14,699,281	545,734
18	2006	4,597,468	430,119	9%	5,071,972	474,511	15,173,792	512,792
19	2007	2,786,791	637,957	23%	3,536,671	809,621	15,983,414	571,784
20	2008	1,986,969	380,068	19%	2,895,744	553,900	16,537,313	582,530
21	2009	463,089	473,718	102%	548,163	560,745	17,098,059	565,572
22	2010	5,853,934	316,309	5%	8,080,302	436,608	17,534,667	569,539
23								
24	Correction Factor for Replacements	{4}		23.2%				
25								
26								
27								
28								
29	REGRESSION RESULTS						Investment col. (6) vs Design Day col. (7)	
30	Slope =						\$83.56	
31	Y Intercept =						(\$31,882,737)	
32	Coefficient of Determination (RSQR)						44.50%	
33	t Probability						3.2	
34								
35	MARGINAL COST ESTIMATES							
36	Trended Cost Per Design Day Therms						\$83.56	
37								
38	Average Cost Per Design Day Therms							
39	1996-2010						\$203.96	
40	2001-2010						\$93.87	
41	2005-2010						\$119.11	
42								
43								
44	Marginal cost estimate (29)*{(35) {5}				\$93.87			

NOTES:

- Source: Successive Differences in Table 2, page 2, line 3 adjusted by Handy Whitman Index
- Source: Table 2, Page 4
- Source: Table - 2, Page 2.
- Based on the average of the ratios (mains extension investments over mains total investment)
- This estimate is provided for comparison purposes only. Refer to pages 3 & 4 of this table for the development of a more accurate estimate, eliminating the error associated with estimating replacements.
- In 2009 growth related investment exceeded actual investment. A discussion with the company revealed that 2009 contained investments of prior years, and that the work orders were closed in 2009. Costs could not be segregated due to the amount of work to segregate those investments it was left as is since it is one observation in the regression.

Table - 3
Northern Utilities- New Hampshire
Marginal Cost Study

Services and Meters Investment

Line No.	Description	----- Residential -----		----- Small C&I -----		----- Medium C&I -----		----- Large C&I -----	
		ResNonHt&LI R-6&R-11	ResHt&LI R-5&R-10	SmHiW G-40	SmLoW G-50	MdHiW G-41	MdLoW G-51	LgHiW G-42	LgLoW G-52
		(1)	(2)	(4)	(5)	(6)	(7)	(8)	(9)
1	SERVICE COSTS								
2									
3									
4	Representative Cost {1}	\$4,137	\$4,137	\$5,045	\$5,045	\$7,424	\$7,424	\$34,416	\$34,416
5									
6									
7									
8	Services per Customer {2}	0.73	0.73	0.73	0.73	1.00	1.00	1.00	1.00
9									
10									
11									
12	Average Service Cost per Cust.	\$3,035	\$3,035	\$3,702	\$3,702	\$7,424	\$7,424	\$34,416	\$34,416
13	{4}*(8)								
14									
15									
16	METER COSTS								
17									
18									
19	Current Unit Cost for Metering {3}	\$459	\$459	\$3,089	\$3,089	\$6,746	\$6,746	\$12,000	\$12,000
20									
21									
22									
23	Customer Count {4}								
24									
25									
26	Meters per Customer	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
27									
28									
29									
30	Avg Metering Cost per Cust.	\$461	\$461	\$3,101	\$3,101	\$6,772	\$6,772	\$12,046	\$12,046
31	{19}*(26)								

NOTES:

- 1 Source: Typical service costs as estimated by the Engineering Department as 2010 costs including overhead loading.
- 2 Source: Services per Meter computed by assigning one service to each medium and large C&I customer and computing the ratio of remaining services to the total of residential and small C&I customers.
- 3 Source: Replacement Cost New Analysis including an allowance for spare meters.

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Table - 4
Northern Utilities- New Hampshire
Marginal Cost Study

Summary of Marginal Commodity Costs

Line No.	Description	----- Residential -----		----- Small C&I -----		----- Medium C&I -----		----- Large C&I -----		Total Company
		ResNonHt&LI	ResHt&LI	SmHiW	SmLoW	MdHiW	MdLoW	LgHiW	LgLoW	
		R-6&R-11	R-5&R-10	G-40	G-50	G-41	G-51	G-42	G-52	
	LOAD WEIGHTED MARGINAL COMMODITY	(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)

1
2
3
4
5
6
7
8
9
10

MARGINAL COMMODITY COSTS NOT COMPUTED FOR DISTRIBUTION MARGINAL COST STUDY

Table - 4
Northern Utilities- New Hampshire
Marginal Cost Study

Development of Capacity Related Production Expense

Line No.	Year	Total Capacity Related Expenses	Cost Index	Expense 2010 Dollars	Design Day Sendout, Therm	Average Cost per Design Day Therm
	(1)	(2)	(3)	(4)	(5)	(6)
		{1}				
1						
2						
3						
4						
5						
6						
7						
8						
9	1997	63,064	1.3086	82,528	519,260	0.16
10	1998	54,851	1.2940	70,979	534,600	0.13
11	1999	52,127	1.2753	66,476	541,340	0.12
12	2000	23,619	1.2483	29,483	525,529	0.06
13	2001	20,574	1.2207	25,114	520,249	0.05
14	2002	17,212	1.2012	20,675	517,753	0.04
15	2003	20,754	1.1759	24,404	528,031	0.05
16	2004	28,986	1.1435	33,144	538,347	0.06
17	2005	21,038	1.1065	23,279	567,560	0.04
18	2006	29,043	1.0716	31,123	545,734	0.06
19	2007	27,962	1.0410	29,108	512,792	0.06
20	2008	20,111	1.0187	20,487	571,784	0.04
21	2009	5	1.0095	5	582,530	0.00
22	2010	6,964	1.0000	6,964	565,572	0.01
23						
24	REGRESSION RESULTS				Expense (4)	Avg Cost (6)
25				vs Demand (5)	vs Year (1)	
26	Slope =			-0.4844	-0.0090	
27	Y Intercept =			295101	18	
28	Coefficient of Determination (R**2)			21.38%	68.97%	
29	t Value			(1.8)	(5.2)	
30						
31	MARGINAL COST ESTIMATES					
32	Trended Cost Per Design Day Therms				(\$0.48)	
33	Time Series Predicted Avg Cost (2008*slope)+intercept				(\$0.01)	
34						
35	Average Cost Per Design Day Therms					
36	1996-2010				\$0.06	
37	2001-2010				\$0.04	
38	2005-2010				\$0.03	
39	Current Average Cost per Design Day Therms					\$0.01
40						
41	Assumed Marginal Cost			(35)	\$0.03	
42						
43						
44	Percentage Related to Transportation			{2}	0.0%	
45	Transportation Related Investment			(39)*(42)	<u>\$0.00</u>	
46	Gas Supply Related Investment			(39)*[1-(42)]	<u>\$0.03</u>	

NOTES:

- 1 Source: Booked maintenance and other expenses for Manufactured Gas.
- 2 Source: Table - 1, page 3.

Table - 5
Northern Utilities- New Hampshire
Marginal Cost Study

Development of Capacity Related Expense - T & D

Line No.	Year	Capacity Related Expenses	Cost Index	Expense 2010 Dollars	Design Day Sendout	Avg Cost Per Des'n Day Therm
	(1)	(2)	(3)	(4)	(5)	(6)
1						
2						
3						
4						
5						
6						
7						
8	1996	760,781	1.3318	1,013,176	519,260	1.95
9	1997	457,448	1.3086	598,638	534,600	1.12
10	1998	442,526	1.2940	572,644	541,340	1.06
11	1999	677,886	1.2753	864,490	525,529	1.64
12	2000	806,519	1.2483	1,006,741	520,249	1.94
13	2001	738,972	1.2207	902,045	517,753	1.74
14	2002	613,748	1.2012	737,252	528,031	1.40
15	2003	737,781	1.1759	867,570	538,347	1.61
16	2004	612,561	1.1435	700,439	567,560	1.23
17	2005	576,831	1.1065	638,286	545,734	1.17
18	2006	609,676	1.0716	653,347	512,792	1.27
19	2007	590,679	1.0410	614,895	571,784	1.08
20	2008	764,750	1.0187	779,071	582,530	1.34
21	2009	1,402,178	1.0095	1,415,474	565,572	2.50
22	2010	1,319,234	1.0000	1,319,234	569,539	2.32
23						
24	REGRESSION RESULTS				Expense (4)	Avg Cost (6)
25				vs Demand (5)	vs Year (1)	
26	Slope =			1.6715	0.0240	
27	Y Intercept =			-61585	-46	
28	Coefficient of Determination (RSQR)			2.3%	5.6%	
29	t Statistic			0.55	0.87	
30						
31	MARGINAL COST ESTIMATES					
32	Trended Cost Per Design Day Therms			\$1.67		
33	Time Series Predicted Avg Cost = 2008 * Slope + Intercept				\$1.77	
34						
35	Average Cost Per Design Day Therms					
36	1996-2010				\$1.56	
37	2001-2010				\$1.57	
38	2005-2010				\$1.62	
39	Current Average Cost per Design Day Therms				\$2.32	
40						
41	Assumed Marginal Cost		{3}	{34}	<u>\$1.62</u>	

NOTES:

- 1 Source: Table - 5, Page 2.
- 2 Source: GDP Implicit Price Deflator.
- 3 Average costs per DD Therm appear to be relatively stable over time. However since, 2007 Costs appear to be rising. So a recent 5 year average incremental cost was used.

Table - 5
Northern Utilities- New Hampshire
Marginal Cost Study

Operations Expense Data - T&D

Line No.	Acct No.	Description	1994	1995	1996	1997	1998	1999	2000	2001	2002
		(1)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
TRANS & DIST EXPENSE {1}											
1	850	Operation Supervision and Eng.	{2}	0	0	0	0	0	188,593	170,002	177,162
2	851	System Control and Load Disp.	capacity	0	0	0	0	0	0	2,487	184
3	852	Communication System Exp.	{3}	0	0	0	0	0	10,757	17,793	19,335
4	856	Mains Expenses	{3}	0	0	0	0	0	0	0	0
5	857	Meas. and Reg. Station Exp.	capacity	0	0	0	0	0	42,830	53,918	26,935
6	863	Maint. Of Mains	capacity	0	0	0	0	0	0	2,043	22
7		Total Transmission		0	0	0	0	0	242,180	246,244	223,639
8											
9		OPERATIONS EXPENSE									
10	870	Operation Supervision and Eng	{2}	0	870,955	648,480	754,097	678,706	0	0	0
11	874	Mains and Services Expenses	{3}	0	0	0	0	0	434,731	412,373	418,784
12	875	Measuring and Reg. Station Exp.-Gen.	capacity	0	0	0	0	0	0	0	0
13	876	Measuring and Reg. Station Exp. - Ind.	capacity	0	0	0	0	0	0	0	0
14	877	Meas. & Reg. Station Exp.-City Gate	capacity	0	0	0	0	0	83,805	88,895	79,121
15	878	Meter and House Regulator Exp.	customer	0	407,945	429,494	434,752	376,374	381,417	364,462	365,756
16	879	Customer Installations Exp.	customer	0	25,581	69,794	166,355	73,746	591,125	535,694	361,310
17	880	Other Expenses	{2}	0	0	0	0	0	(416,495)	(399,888)	(496,264)
18	881	Rents	{2}	0	0	0	0	0	1,747	1,928	1,046
19											
20		Marginal Oper Exp	Sum(10-18)	0	1,304,481	1,147,768	1,355,204	1,128,826	1,076,331	1,003,465	729,754
21											
22		MAINTENANCE EXPENSE									
23	885	Maintenance Supervision and Engineering	{2}	0	0	0	0	0	563	0	0
24	886	Maint.of Structures and Improvements	capacity	0	15,729	17,355	19,089	21,047	21,407	32,541	20,411
25	887	Maintenance of Mains	capacity	0	377,670	243,851	226,720	379,282	283,709	205,860	216,906
26	889	Maint. of Meas. and Reg. Sta. Equip.-Gen.	capacity	0	0	0	0	0	29,433	37,182	20,697
27	890	Maint. of Meas. and Reg. Sta. Equip.-Ind.	capacity	0	0	0	0	0	0	0	0
28	891	Maint. of Meas. and Reg. Sta. Equip.-City Gate	capacity	0	0	0	0	0	0	0	0
29	892	Maintenance of Services	customer	0	94,173	79,118	60,743	107,983	118,231	137,131	103,593
30	893	Maintenance of Meters and House Reg.	customer	0	11,535	23,539	34,628	20,487	12,875	3,719	5,460
31	894	Maintenance of Other Equipment	{2}	0	0	0	0	0	312,407	266,739	178,107
32											
33		Marginal Maint Exp	Sum(23-31)	0	499,107	363,863	341,180	528,799	778,625	683,171	545,175
34											
35		MARGINAL T & D Exp & Superintendence	(20)+(33)	0	1,803,588	1,511,631	1,696,384	1,657,625	2,097,136	1,932,880	1,498,568
36											
37			{2}	0	870,955	648,480	754,097	678,706	86,815	38,781	(139,948)
38			{3}	0	0	0	0	0	445,488	430,166	438,119
39			Capacity	0	393,399	261,206	245,809	400,329	461,184	422,926	364,277
40			Customer	0	539,234	601,945	696,478	578,590	1,103,649	1,041,006	836,120
41											
42		Allocation of Dist Lines to Customer Component									
43		Services Investment		13,093,569	14,215,570	15,343,058	16,395,084	17,316,520	18,225,158	19,031,262	20,121,536
44		Mains Investment		30,884,264	36,225,118	37,568,970	39,178,319	40,532,171	42,573,536	43,946,403	45,608,517
45		Services/(Services+Mains)	(30)/[(30)+(31)]	29.77%	28.18%	29.00%	29.50%	29.93%	29.98%	29.98%	29.98%
46		Customer-related Dist Lines Expense	(32)*(4)	0	0	0	0	0	133,541	128,948	131,332
47		Capacity-related Dist Lines Expense		0	0	0	0	0	311,948	301,219	306,788
48		Customer Related Allocation of Superintendence Expense									
49		Customer %			57.82%	69.74%	73.91%	59.10%	61.54%	61.77%	59.04%
50		Customer Super & Other			503,573	452,238	557,380	401,149	53,428	23,955	(82,632)
51		Capacity %			42.18%	30.26%	26.09%	40.90%	38.46%	38.23%	40.96%
52		Capacity Superintendence & Other			367,382	196,242	196,717	277,557	33,388	14,827	(57,317)
53											
54		Total Customer - Related			1,042,807	1,054,183	1,253,858	979,739	1,290,617	1,193,908	884,820
55											
56		Total Capacity - Related Expenses			760,781	457,448	442,526	677,886	806,519	738,972	613,748
57		Non-Marginal			0	0	0	0	0	0	0

NOTES:

- 1 Source: Annual Reports
- 2
- 3

Table - 5
Northern Utilities- New Hampshire
Marginal Cost Study

Operations Expense Data - T&D

Line No.	Acct No.	Description	2003	2004	2005	2006	2007	2008	2009	2010	
		(1)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	
TRANS & DIST EXPENSE											
1	850	Operation Supervision and Eng.	{2}	227,097	212,621	236,483	255,882	248,821	307,171	0	0
2	851	System Control and Load Disp.	capacity	0	0	0	0	0	0	0	0
3	852	Communication System Exp.	{3}	16,199	16,898	10,702	12,104	13,632	26,943	20,261	30,680
4	856	Mains Expenses	{3}	0	0	0	0	0	0	395	3
5	857	Meas. and Reg. Station Exp.	capacity	39,238	41,226	42,983	39,233	35,709	41,266	0	821
6	863	Maint. Of Mains	capacity	340	0	547	0	0	0	67	0
7		Total Transmission		282,874	270,745	290,716	307,219	298,161	375,380	20,724	31,504
OPERATIONS EXPENSE											
10	870	Operation Supervision and Eng	{2}	0	0	0	0	0	155,548	64,421	30,859
11	874	Mains and Services Expenses	{3}	409,564	410,614	402,560	441,251	456,114	489,191	512,608	562,176
12	875	Measuring and Reg. Station Exp.-Gen.	capacity	0	0	0	0	0	3,766	160,482	152,142
13	876	Measuring and Reg. Station Exp. - Ind.	capacity	0	0	0	0	0	0	0	0
14	877	Meas. & Reg. Station Exp.-City Gate	capacity	81,127	75,260	78,488	67,653	74,184	58,111	0	0
15	878	Meter and House Regulator Exp.	customer	430,472	424,806	466,131	560,865	560,268	546,903	817,734	804,803
16	879	Customer Installations Exp.	customer	332,784	419,791	347,791	309,904	300,100	311,003	108,556	39,486
17	880	Other Expenses	{2}	(453,877)	(568,926)	(563,836)	(563,928)	(541,638)	(557,208)	783,922	711,532
18	881	Rents	{2}	1,852	1,063	2,080	2,289	2,283	2,821	0	0
20		Marginal Oper Exp	Sum(10-18)	801,922	762,608	733,214	818,035	851,311	1,010,135	2,447,724	2,300,999
MAINTENANCE EXPENSE											
23	885	Maintenance Supervision and Engineering	{2}	0	0	0	0	0	7,628	111,800	68,440
24	886	Maint.Of Structures and Improvements	capacity	28,250	23,106	38,069	39,649	33,298	37,351	8,234	5,588
25	887	Maintenance of Mains	capacity	298,390	253,869	221,887	182,359	192,097	249,701	284,070	257,655
26	889	Maint. of Meas. and Reg. Sta. Equip.-Gen.	capacity	25,662	24,821	23,419	69,957	27,549	35,649	31,393	20,567
27	890	Maint. of Meas. and Reg. Sta. Equip.-Ind.	capacity	0	0	0	0	0	0	4,289	(526)
28	891	Maint. of Meas. and Reg. Sta. Equip.-City Gate	capacity	0	0	0	0	0	4,109	28,801	28,896
29	892	Maintenance of Services	customer	79,878	91,727	75,714	85,714	105,441	104,878	42,538	71,698
30	893	Maintenance of Meters and House Reg.	customer	27,656	43,674	57,077	70,242	62,231	28,066	33,576	103,807
31	894	Maintenance of Other Equipment	{2}	148,373	87,894	25,585	26,056	18,635	18,889	218,606	225,249
33		Marginal Maint Exp	Sum(23-31)	608,210	525,092	441,752	473,976	439,250	486,271	763,307	781,373
35		MARGINAL T & D Exp & Superintendence	(20)+(33)	1,693,005	1,558,446	1,465,681	1,599,230	1,588,723	1,871,786	3,231,754	3,113,876
37			{2}	(76,555)	(267,347)	(299,688)	(279,700)	(271,899)	(65,151)	1,178,748	1,036,080
38			{3}	425,763	427,512	413,262	453,355	469,745	516,134	533,265	592,860
39			Capacity	473,007	418,284	405,394	398,851	362,836	429,952	517,336	465,143
40			Customer	870,790	979,998	946,713	1,026,725	1,028,040	990,850	1,002,405	1,019,794
Allocation of Dist Lines to Customer Component											
43		Services Investment		20,957,811	21,950,166	22,501,256	23,747,433	24,504,110	25,310,140	25,924,573	31,874,279
44		Mains Investment		47,288,473	49,392,846	50,531,680	54,591,098	57,186,366	59,131,775	59,604,088	65,458,022
45		Services/(Services+Mains)	(30)/[(30)+(31)]	29.98%	29.98%	29.98%	29.98%	29.98%	29.98%	29.98%	29.98%
46		Customer-related Dist Lines Expense	(32)*(4)	127,628	128,152	123,880	135,899	140,812	154,718	159,853	177,717
47		Capacity-related Dist Lines Expense		298,135	299,360	289,382	317,456	328,933	361,417	373,413	415,143
Customer Related Allocation of Superintendence Expense											
49		Customer %		56.42%	60.69%	60.64%	61.88%	62.82%	59.14%	56.61%	57.63%
50		Customer Super & Other		(43,194)	(162,264)	(181,743)	(173,070)	(170,809)	(38,532)	667,319	597,131
51		Capacity %		43.58%	39.31%	39.36%	38.12%	37.18%	40.86%	43.39%	42.37%
52		Capacity Superintendence & Other		(33,361)	(105,083)	(117,945)	(106,630)	(101,091)	(26,619)	511,430	438,949
54		Total Customer - Related		955,224	945,886	888,850	989,554	998,044	1,107,035	1,829,576	1,794,642
56		Total Capacity - Related Expenses		737,781	612,561	576,831	609,676	590,679	764,750	1,402,178	1,319,234
57		Non-Marginal		0	0	0	0	0	0	0	0

NOTES:

- 1 Source: Annual Reports
- 2
- 3

Table - 6
Northern Utilities- New Hampshire
Marginal Cost Study

Development of Customer-Related Plant Expense

Line No.	Year	Services and Meters Expenses	Mains Customer Related Expenses	Total Customer Related Expenses	Cost Index	Expense 2010 Dollars	Annual Customers	Average Cost per Customer
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		{1}		(2)+(3)	{2}	(4)*(5)		(6)/(7)
1	1989							
2	1990							
3	1991							
4	1992							
5	1993							
6	1994							
7	1995							
8	1996	1,042,807	0	1,042,807	1.3318	1,388,765	21,885	\$63.46
9	1997	1,054,183	0	1,054,183	1.3086	1,379,552	22,490	\$61.34
10	1998	1,253,858	0	1,253,858	1.2940	1,622,536	23,307	\$69.62
11	1999	979,739	0	979,739	1.2753	1,249,435	23,622	\$52.89
12	2000	1,290,617	0	1,290,617	1.2483	1,611,019	25,564	\$63.02
13	2001	1,193,908	0	1,193,908	1.2207	1,457,375	25,952	\$56.16
14	2002	884,820	0	884,820	1.2012	1,062,871	26,439	\$40.20
15	2003	955,224	0	955,224	1.1759	1,123,265	26,843	\$41.85
16	2004	945,886	0	945,886	1.1435	1,081,583	26,676	\$40.55
17	2005	888,850	0	888,850	1.1065	983,547	27,172	\$36.20
18	2006	989,554	0	989,554	1.0716	1,060,436	27,510	\$38.55
19	2007	998,044	0	998,044	1.0410	1,038,960	27,626	\$37.61
20	2008	1,107,035	0	1,107,035	1.0187	1,127,766	27,925	\$40.39
21	2009	1,829,576	0	1,829,576	1.0095	1,846,925	28,276	\$65.32
22	2010	1,794,642	0	1,794,642	1.0000	1,794,642	28,134	\$63.79
23								
24				Expense (6)		Unit Cost (8)		
25	REGRESSION RESULTS			vs Customers (7)		vs Year (1)		
26	Slope =			-17.5400		-1.0503		
27	Y Intercept =			1777273		2155		
28	Coefficient of Determination (RSQR)			1.7%		14.5%		
29	t Value			-0.47		-1.49		
30								
31	MARGINAL COST ESTIMATES							
32	Trended Cost Per Customer			(\$17.54)		44.04		
33								
34	Average Cost Per Customer:							
35	1989-2010					\$50.92		
36	2001-2010					\$46.15		
37	2005-2010					\$47.12		
38	Current Average Cost per Customer					\$63.79		
39	Time Series Test Year Prediction					\$41.94		
40								
41	Assumed Marginal Cost {3}					<u>\$47.12</u>		

NOTES:

- Source: Table - 5, Page 2.
- Source: GDP Implicit Price Deflator.
- Regression results for time series are not sufficiently robust for marginal cost estimate. Recently average costs have trended higher so I employed near-term average marginal cost estimate as most representative.

Table - 6
Northern Utilities- New Hampshire
Marginal Cost Study

Class Weighted Customer Plant Related Expense

----- Customer Weightings -----				----- Customer Weightings -----			
Line No.	Customer Groups	Number of Customers	Service & Meter Cost Assigned	Total Cost	Relative Weight Per Cust	System Avg Marginal Cost per Cust	Marginal Costs Per Cust
	(1)	(2) {1}	(3) {2}	(4)=(3)*(2)	(5)=(3)/avg(3) {3}	(6) {4}	(7)=(5)*(6)
1	ResNonHt	1,653	\$3,496	5,778,985	0.775	\$47.12	\$36.51
2	ResHt	20,262	3,496	70,832,353	0.775	\$47.12	\$36.51
3	SmLoS	4,416	6,802	30,037,893	1.508	\$47.12	\$71.05
4	SmHiS	969	6,802	6,591,534	1.508	\$47.12	\$71.05
5	MdLoS	543	14,196	7,703,226	3.147	\$47.12	\$148.27
6	MdHiS	234	14,196	3,324,947	3.147	\$47.12	\$148.27
7	LgLoS	30	46,462	1,397,595	10.299	\$47.12	\$485.29
8	LgHiS	27	46,462	1,253,176	10.299	\$47.12	\$485.29
9							
10							
11							
12							
13							
14	Total	28,134	141,912	126,919,710	1.000	\$47.12	\$47.12
15							
16	Avg Cost per cust		\$4,511.32				
17	(4) Total / (2) Total						

NOTES:

- 1 Source: Sales and Demand Model.
- 2 Source: Meters plus services investment from Table - 3 , page 1.
- 3 Relative weights based on average cost per customer, and service and meter cost assigned.
- 4 Source: Table 6, Page 1.

Table - 6
Northern Utilities- New Hampshire
Marginal Cost Study

Development of Customer Accounting & Marketing Expense

Line No.	Year	Customer Accounting Expenses (Excl. Uncoll)	Marketing Services Expenses 911-916	Total Customer Related Expenses	Cost Index	Expense in 2010 Dollars	Annual Customers	Average Cost per Customer
	(1)	(2) {1}	(3) {1}	(4) (2)+(3)	(5) {2}	(6) (4)*(5)	(7)	(8) (6)/(7)
1	1989							
2	1990							
3	1991							
4	1992							
5	1993							
6	1994							
7	1995							
8	1996	1,222,490	672,083	1,894,573	1.3318	2,523,111	21,885	115.29
9	1997	978,181	883,078	1,861,259	1.3086	2,435,730	22,490	108.30
10	1998	560,965	438,631	999,596	1.2940	1,293,512	23,307	55.50
11	1999	602,857	585,758	1,188,615	1.2753	1,515,809	23,622	64.17
12	2000	540,036	471,626	1,011,662	1.2483	1,262,811	25,564	49.40
13	2001	581,715	515,751	1,097,466	1.2207	1,339,650	25,952	51.62
14	2002	618,924	846,724	1,465,648	1.2012	1,760,579	26,439	66.59
15	2003	441,107	773,860	1,214,966	1.1759	1,428,701	26,843	53.22
16	2004	288,736	667,404	956,139	1.1435	1,093,308	26,676	40.98
17	2005	340,161	473,121	813,282	1.1065	899,928	27,172	33.12
18	2006	273,863	534,380	808,243	1.0716	866,138	27,510	31.48
19	2007	254,478	612,788	867,266	1.0410	902,821	27,626	32.68
20	2008	384,374	453,970	838,345	1.0187	854,044	27,925	30.58
21	2009	1,620,497	0	1,620,497	1.0095	1,635,864	28,276	57.85
22	2010	2,152,066	0	2,152,066	1.0000	2,152,066	28,134	76.49
23								
24	REGRESSION RESULTS							
25						Expense (5) vs Customers (6)		Unit Cost (8) vs Year (1)
26	Slope =					-146.3220		-3.3612
27	Y Intercept =					5262991		6790
28	Coefficient of Determination (RSQR)					32.0%		33.60%
29	t Probability					-2.47		-2.56
30								
31	MARGINAL COST ESTIMATES							
32	Trended Cost Per Customer					(\$146.32)		
33	Time Series predicted Average Cost (2010)*slope+intercept							\$34.29
34								
35	Average Cost Per Customer:							
36	1989-2010					\$56.40		
37	2001-2010					\$47.45		
38	2005-2010					\$43.87		
39	Current Average Cost per Customer					\$76.49		
40	Average Cost Per Customer 2008-2010:					\$55.04		
41								
42	Assumed Marginal Cost			{3}		<u>\$43.87</u>		

NOTES:

- Source: Cost data from Annual Reports, ACCTS 901-910 excluding Uncollectible Accounts Expense in Account 904.
- Source: GDP Implicit Price Deflator.
- Regression results for time series are insufficiently robust for marginal cost, but confirm an inclining trend. Therefore, the current average cost over near term will be used to estimate the Marginal Cost.

Table - 6
Northern Utilities- New Hampshire
Marginal Cost Study

Class Weighted Customer Accounting & Marketing Expense

Line No.	Customer Groups	Number of Customers	Allocated Customer Accounting	Average Costs Per Cust	Relative Weight Per Cust	Company Avg Cost per Cust	Marginal Costs Per Cust
	(1)	(2)	(3)	(4)= (3)/(2)	(5)={(4)/avg(4)}	(6)	(7)= (5)*(6)
			{1} {2}		{3}	{4}	
1	ResNonHt	1,653	\$121,485	\$73.49	0.961	\$43.87	\$42.15
2	ResHt	20,262	\$1,486,150	\$73.35	0.959	\$43.87	\$42.07
3	SmLoS	4,416	\$360,948	\$81.74	1.069	\$43.87	\$46.88
4	SmHiS	969	\$79,802	\$82.36	1.077	\$43.87	\$47.23
5	MdLoS	543	\$64,540	\$118.94	1.555	\$43.87	\$68.21
6	MdHiS	234	\$27,689	\$118.22	1.545	\$43.87	\$67.80
7	LgLoS	30	\$5,050	\$167.87	2.195	\$43.87	\$96.28
8	LgHiS	27	\$6,403	\$237.37	3.103	\$43.87	\$136.14
9							
10							
11							
12							
13							
14	Total	28,134	2,152,066	\$76.49	1.744	\$43.87	\$43.87

NOTES:

- 1 Total taken from Table 6, Page 3, column 4.
- 2 Accts 902, 903 allocated by ACOS, and 908 & 909 by customers.
- 3 Relative weights based on column 4.
- 4 Source: Table 6, Page 3.

Table - 6
Northern Utilities- New Hampshire
Marginal Cost Study

Class Weighted Uncollectible Accounts Expense

Line No.	Customer Groups	Acct. 904		Total Normalized Revenues	Write-off Percentage	
	(1)	(2)	(3) {1}	(4)	(5) {2}	(6) (6)=(4)/(5)
1	ResNonHt		\$4,096		\$506,169	0.81%
2	ResHt		\$159,331		\$8,599,677	1.85%
3	SmLoS		\$7,083		\$4,289,787	0.17%
4	SmHiS		\$1,909		\$931,201	0.21%
5	MdLoS		\$5,436		\$2,724,275	0.20%
6	MdHiS		\$1,001		\$906,734	0.11%
7	LgLoS		\$92		\$1,078,110	0.01%
8	LgHiS		\$0		\$1,932,912	0.00%
9						
10						
11						
12						
13						
14	Total		\$178,947		\$20,968,864	0.85%
15						
	Adjusted Pro forma writeoff rate				0.85%	

NOTES:

- 1 Total account 904 less Gas Costs.
- 2 Total normalized delivery revenues. Provided by ACOS Study.

Table - 7
Northern Utilities- New Hampshire
Marginal Cost Study

Development of A & G Loading Factors

Line No.	Description	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	Nonplant Related Expenses													
2	920 Salary	377,195	564,700	350,345	346,351	536,249	411,410	511,776	147,472	55,658	92,274	206,331	211,213	(37,353)
3	921 Office Supplies	474,724	417,796	474,381	366,115	406,798	219,748	536,028	491,618	422,080	394,120	221,377	295,388	262,722
4	922 Admin Exp - Transf (Credit)	(2,735,969)	(2,350,559)	(1,334,118)	(1,093,635)	(1,328,173)	(1,112,188)	(869,552)	(848,848)	(843,265)	(796,476)	(1,113,567)	(1,113,137)	(907,934)
5	923 Outside Services	2,994,222	2,493,162	3,164,747	3,004,239	3,637,219	3,702,888	3,647,580	3,037,300	3,881,628	3,564,501	4,034,655	4,645,578	3,711,622
6	926 Pension	843,461	956,655	762,195	1,065,461	783,982	693,074	1,139,598	1,372,359	1,376,018	1,213,675	1,484,008	1,190,594	930,259
7	927 Franchise Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0
8	928 Regulatory Exp	60,779	80,360	94,232	79,230	92,600	65,340	103,798	42,498	165,512	250,414	289,961	191,533	242,391
9	930 Misc	166,028	600,256	780,242	699,324	354,694	315,897	166,096	45,420	596,972	494,334	588,530	602,033	467,986
10														
11														
12														
13	Total Non-Plant	2,180,440	2,762,370	4,292,024	4,467,085	4,483,369	4,296,169	5,235,324	4,287,818	5,654,602	5,212,843	5,711,296	6,023,201	4,669,694
14														
15	Plant Related Expenses													
16														
17														
18	924 Property Ins	0	0	0	0	0	0	0	0	0	0	0	49,034	47,135
19	925 Injury & Damages	179,576	247,527	197,850	98,199	203,433	142,471	108,826	751,284	(283,904)	556,078	432,130	297,661	358,054
20	929 Duplicate Charges	0	0	0	0	0	0	0	0	0	0	0	0	0
21	931 Rents	0	0	0	0	0	0	0	(18,000)	(15,285)	(18,837)	(19,478)	(19,478)	354
22	932 Gen Plt Maint	0	0	0	0	0	0	0	0	0	0	0	0	0
23	935 Maint. Of General Plant	<u>77,712</u>	<u>61,873</u>	<u>51,480</u>	<u>56,457</u>	<u>51,627</u>	<u>54,025</u>	<u>49,652</u>	<u>652,561</u>	<u>549,338</u>	<u>662,682</u>	<u>572,079</u>	<u>556,794</u>	<u>358,185</u>
24														
25	Total Plant Related Expenses	\$257,288	\$309,400	\$249,330	\$154,656	\$255,060	\$196,496	\$158,478	\$1,385,845	\$250,149	\$1,199,923	\$984,731	\$884,012	\$763,729
26														
27	Total Allocable O&M (Total O&M less non-labor production costs and A&G expenses)	3,908,662	3,989,118	3,087,130	3,372,440	3,258,611	3,132,725	3,334,653	3,320,476	2,890,000	2,587,997	2,758,835	2,895,945	2,994,655
28														
29														
30	A & G Loading Factor Nonplant Rel Exp													
31	Line (13)/(25)	55.78%	69.25%	139.03%	132.46%	137.59%	137.14%	157.00%	129.13%	195.66%	201.42%	207.02%	207.99%	155.93%
32	Average 2005 - 2010 = 146.98%													
33														
34														
35	Total Gross Plant \$	63,624,556	68,271,573	71,823,646	74,905,563	78,585,950	80,881,339	84,400,533	89,451,213	92,538,749	94,753,557	100,650,010	104,956,224	108,799,813
36														
37														
38	A & G Loading Factor Plant Rel Exp													
39	Line (22)/(32)	0.40%	0.45%	0.35%	0.21%	0.32%	0.24%	0.19%	1.55%	0.27%	1.27%	0.98%	0.84%	0.70%
40	Average 2005 - 2010 = 0.74%													

NOTES:
1 Source: Annual Reports

001099

Table - 7
Northern Utilities- New Hampshire
Marginal Cost Study
Development of Miscellaneous Loading Factors

Line No.	Description	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	Materials and Supplies and Prepayments Loader													
2	Materials and Supplies	501,725	592,798	670,629	674,451	774,134	497,805	455,452	460,284	667,900	806,875	791,806	871,400	1,648,857
3														
4	Prepayments	1,988,580	1,798,306	2,098,238	2,359,041	2,148,760	2,100,142	14,643	493,514	620,302	563,007	386,167	320,941	528,546
5														
6	Total Utility Plant	63,624,556	68,271,573	71,823,646	74,905,563	78,585,950	80,881,339	84,400,533	89,451,213	92,538,749	94,753,557	100,650,010	104,956,224	108,799,813
7														
8	Non-Fuel Loader (2-3+4-5)/(6)	{1}	3.91%	3.50%	3.86%	4.05%	3.72%	3.21%	0.56%	1.07%	1.39%	1.45%	1.17%	1.14%
9	Average 2005 - 2010 = 1.34%													2.00%
10														
11														
12														
13	General Plant Loading Factor													
14	Total General Plant	2,102,512	2,362,936	2,555,764	2,620,695	2,675,448	2,281,051	2,310,365	4,077,153	3,976,035	3,984,419	4,113,313	4,158,083	4,280,158
15	Total Utility Plant	63,624,556	68,271,573	71,823,646	74,905,563	78,585,950	80,881,339	84,400,533	89,451,213	92,538,749	94,753,557	100,650,010	104,956,224	108,799,813
16														
17	Gen Plant Factor (14)/(15-14)	{1}	3.42%	3.59%	3.69%	3.63%	3.52%	2.90%	2.81%	4.78%	4.49%	4.39%	4.26%	4.13%
18	Average 2005 - 2010 = 4.49%													4.10%

NOTES:

001100

Table - 8
Northern Utilities- New Hampshire
Marginal Cost Study

Summary of Levelized Fixed Charge Rates

Line No.	Description	Engineer's Fixed Charge Rate	Economist's Fixed Charge Rate
	(1)	(2)	(3)
1	FIXED CHARGE RATE RESULTS		
2			Over
3	Levelized Cost for: {1}		Book Life
4	Production Plant		
5	Mains (Cap-related Dist)	9.79%	7.24%
6	Services Investment	9.57%	6.92%
7	Meters Investment	10.98%	8.46%
8			
9			
10	INCREMENTAL COST OF CAPITAL {2}		
11	Debt	5.73%	59.75%
12	Preferred	0.00%	0.00%
13	Common	10.50%	40.25%
14	Other	0.00%	0.00%
15	Weighted Cost of Incremental Capital		7.65%
16			
17			
18	After Tax Cost of New Capital {3}		6.29%
19	Incremental Tax Rate {4}		39.61%
20	Tax Effectted Cost of Capital {5}		10.42%
21	Property Tax Rate {6}		1.28%
22	Gross Receipts Tax Rate		0.00%
23	Inflation Rate {7}		2.30%
24	Property Tax Escalation Rate {8}		2.80%
25	Commodity Escalation Rate {9}		0.00%

NOTES:

- 1 Source: Table - 8, pages 3, 4, 5, & 6.
- 2 Weighted average current cost of raising capital in 2010.
- 3 Wtd Cost of Capital (15) less tax savings on debt interest.
- 4 Incremental tax rate assumed to be 34% Federal and 8.5% State tax which results in a combined effective rate of 39.61%.
- 5 Tax effected cost of capital, (15) plus tax component on return.
- 6 Weighted average provided by excel file.
- 7 Inflation rate less technical progress of .5%
- 8 Inflation rate estimated for the forward looking five year period.
- 9 Annual Commodity price escalation factor provided by EIA

Table - 8
Northern Utilities- New Hampshire
Marginal Cost Study
LEVELIZED FIXED CHARGE ANALYSIS Rev. 4.0.0
INPUT DATA

LINE NO.	VARIABLE	Peaking Plant	Capacity - Related Distribution	Services	Meters
1	Plant Data		40	45	32
2					
3	CAPITALIZED COST	\$1,000	\$1,000	\$1,000	\$1,000
4	BOOK LIFE		40	45	32
5	SALVAGE VALUE		-23%	-75%	-8%
6	MACRS LIFE	20	20	20	20
7					
8					
9	Capital Structure				
10					
11	DEBT RATIO	59.75%	59.75%	59.75%	59.75%
12	PREFERRED RATIO	0.00%	0.00%	0.00%	0.00%
13	COMMON RATIO	40.25%	40.25%	40.25%	40.25%
14	OTHER _____	0.00%	0.00%	0.00%	0.00%
15					
16	Cost of Capital				
17					
18	DEBT COST	5.73%	5.73%	5.73%	5.73%
19	PREFERRED COST	0.00%	0.00%	0.00%	0.00%
20	COMMON COST	10.50%	10.50%	10.50%	10.50%
21	OTHER	0.00%	0.00%	0.00%	0.00%
22	WTD COST OF CAPITAL	7.65%	7.65%	7.65%	7.65%
23	AFTER TAX COST / CAP	6.29%	6.29%	6.29%	6.29%
24					
25	Tax Data				
26					
27	TAX RATE	39.61%	39.61%	39.61%	39.61%
28	ITC RATE	0.00%	0.00%	0.00%	0.00%
29	REVENUE TAX RATE	0.00%	0.00%	0.00%	0.00%
30	PROPERTY TAX RATE	1.28%	1.28%	1.28%	1.28%
31	PROPERTY INSURANCE	0.00%	0.00%	0.00%	0.00%
32	PROPERTY TAX BASIS	2	2	2	2
33	1 = Original Cost				
34	2 = Depreciated Bal				
35					
36	Misc. Data				
37					
38	INFLATION RATE	2.30%	2.30%	2.30%	2.30%
39	PROP TAX ESC RATE	2.80%	2.80%	2.80%	2.80%
40	RETURN BASIS	2	2	2	2
41	1 = Begin of Year				
42	2 = Avg Begin & End				
43	3 = End of Year				

Table - 8
Northern Utilities- New Hampshire
Marginal Cost Study
LEVELIZED FIXED CHARGE ANALYSIS Rev. 4.0.0
Peaker Plant
NOT USED

-- Current Dollars --
(Engineer's FCR)

-- Constant Dollars --
(Economist's FCR)

LINE NO.	ITEM	CURRENT LEVELIZED DOLLARS	PERCENT OF CAPITAL INVESTMENT	CONSTANT LEVELIZED DOLLARS	PERCENT OF CAPITAL INVESTMENT
1	INTEREST ON DEBT	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	RETURN ON PREF	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	RETURN ON COMMON	<u>#DIV/0!</u>	<u>#DIV/0!</u>	<u>#DIV/0!</u>	<u>#DIV/0!</u>
4					
5	RETURN	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6					
7	DEPRECIATION	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8					
9	INCOME TAX	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	DEFERRED TAXES	<u>#DIV/0!</u>	<u>#DIV/0!</u>	<u>#DIV/0!</u>	<u>#DIV/0!</u>
11					
12	INCOME TAX	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13					
14	REVENUE TAX	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	PROPERTY TAX	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	PROPERTY INSURANCE	<u>#DIV/0!</u>	<u>#DIV/0!</u>	<u>#DIV/0!</u>	<u>#DIV/0!</u>
17					
18	OTHER	<u>#DIV/0!</u>	<u>#DIV/0!</u>	<u>#DIV/0!</u>	<u>#DIV/0!</u>
19					
20					
21	TOTAL REVENUE REQ'D	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Table - 8
Northern Utilities- New Hampshire
Marginal Cost Study
LEVELIZED FIXED CHARGE ANALYSIS Rev. 4.0.0
Capacity Related Distribution

LINE NO.	ITEM	-- Current Dollars -- (Engineer's FCR)		-- Constant Dollars -- (Economist's FCR)	
		CURRENT LEVELIZED DOLLARS	PERCENT OF CAPITAL INVESTMENT	CONSTANT LEVELIZED DOLLARS	PERCENT OF CAPITAL INVESTMENT
1	INTEREST ON DEBT	\$18.76	1.88%	\$13.86	1.39%
2	RETURN ON PREF	\$0.00	0.00%	\$0.00	0.00%
3	RETURN ON COMMON	<u>\$23.17</u>	<u>2.32%</u>	<u>\$17.12</u>	<u>1.71%</u>
4					
5	RETURN	\$41.92	4.19%	\$30.98	3.10%
6					
7	DEPRECIATION	\$30.70	3.07%	\$22.69	2.27%
8					
9	INCOME TAX	\$11.18	1.12%	\$8.26	0.83%
10	DEFERRED TAXES	<u>\$4.01</u>	<u>0.40%</u>	<u>\$2.97</u>	<u>0.30%</u>
11					
12	INCOME TAX	\$15.19	1.52%	\$11.23	1.12%
13					
14	REVENUE TAX	\$0.00	0.00%	\$0.00	0.00%
15	PROPERTY TAX	\$10.09	1.01%	\$7.46	0.75%
16	PROPERTY INSURANCE	<u>\$0.00</u>	<u>0.00%</u>	<u>\$0.00</u>	<u>0.00%</u>
17					
18	OTHER	<u>\$10.09</u>	<u>1.01%</u>	<u>\$7.46</u>	<u>0.75%</u>
19					
20					
21	TOTAL REVENUE REQ'D	\$97.91	9.79%	\$72.36	7.24%

Table - 8
Northern Utilities- New Hampshire
Marginal Cost Study
LEVELIZED FIXED CHARGE ANALYSIS Rev. 4.0.0
Services Investment

LINE NO.	ITEM	-- Current Dollars -- (Engineer's FCR)		-- Constant Dollars -- (Economist's FCR)	
		CURRENT LEVELIZED DOLLARS	PERCENT OF CAPITAL INVESTMENT	CONSTANT LEVELIZED DOLLARS	PERCENT OF CAPITAL INVESTMENT
1	INTEREST ON DEBT	\$15.91	1.59%	\$11.50	1.15%
2	RETURN ON PREF	\$0.00	0.00%	\$0.00	0.00%
3	RETURN ON COMMON	<u>\$19.65</u>	<u>1.96%</u>	<u>\$14.20</u>	<u>1.42%</u>
4					
5	RETURN	\$35.55	3.56%	\$25.70	2.57%
6					
7	DEPRECIATION	\$38.89	3.89%	\$28.11	2.81%
8					
9	INCOME TAX	\$11.80	1.18%	\$8.53	0.85%
10	DEFERRED TAXES	<u>\$1.08</u>	<u>0.11%</u>	<u>\$0.78</u>	<u>0.08%</u>
11					
12	INCOME TAX	\$12.89	1.29%	\$9.31	0.93%
13					
14	REVENUE TAX	\$0.00	0.00%	\$0.00	0.00%
15	PROPERTY TAX	\$8.36	0.84%	\$6.04	0.60%
16	PROPERTY INSURANCE	<u>\$0.00</u>	<u>0.00%</u>	<u>\$0.00</u>	<u>0.00%</u>
17					
18	OTHER	<u>\$8.36</u>	<u>0.84%</u>	<u>\$6.04</u>	<u>0.60%</u>
19					
20					
21	TOTAL REVENUE REQ'D	\$95.68	9.57%	\$69.16	6.92%

Table - 8
Northern Utilities- New Hampshire
Marginal Cost Study
LEVELIZED FIXED CHARGE ANALYSIS Rev. 4.0.0
Metering Equipment

LINE NO.	ITEM	-- Current Dollars -- (Engineer's FCR)		-- Constant Dollars -- (Economist's FCR)	
		CURRENT LEVELIZED DOLLARS	PERCENT OF CAPITAL INVESTMENT	CONSTANT LEVELIZED DOLLARS	PERCENT OF CAPITAL INVESTMENT
1	INTEREST ON DEBT	\$19.39	1.94%	\$14.95	1.50%
2	RETURN ON PREF	\$0.00	0.00%	\$0.00	0.00%
3	RETURN ON COMMON	<u>\$23.95</u>	<u>2.40%</u>	<u>\$18.46</u>	<u>1.85%</u>
4					
5	RETURN	\$43.34	4.33%	\$33.41	3.34%
6					
7	DEPRECIATION	\$33.68	3.37%	\$25.97	2.60%
8					
9	INCOME TAX	\$12.09	1.21%	\$9.32	0.93%
10	DEFERRED TAXES	<u>\$3.62</u>	<u>0.36%</u>	<u>\$2.79</u>	<u>0.28%</u>
11					
12	INCOME TAX	\$15.71	1.57%	\$12.11	1.21%
13					
14	REVENUE TAX	\$0.00	0.00%	\$0.00	0.00%
15	PROPERTY TAX	\$17.03	1.70%	\$13.13	1.31%
16	PROPERTY INSURANCE	<u>\$0.00</u>	<u>0.00%</u>	<u>\$0.00</u>	<u>0.00%</u>
17					
18	OTHER	<u>\$17.03</u>	<u>1.70%</u>	<u>\$13.13</u>	<u>1.31%</u>
19					
20					
21	TOTAL REVENUE REQ'D	\$109.77	10.98%	\$84.62	8.46%

Table - 8
Northern Utilities- New Hampshire
Development of Revenue Requirements Stream
Capacity Related Distribution

Year No.	Rate Base	Interest On Debt	Return On Preferred	Return On Common	Tax Deprec'N	Book Deprec'N	Deferred Tax	Taxable Income	Inc Tax Payable	Revenue Tax	Property Tax	Property Insurance	ANNUAL	% of	Present
													Revenue Req' T's	Original Investm'T	Worth Of Rev Req'M't
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1	1,000.00														
1	983.30	33.65	0.00	41.56	37.50	30.70	2.69	62.01	24.56	6.00	12.76	0.00	145.92	14.59%	137.28
2	943.04	32.27	0.00	39.86	72.19	30.70	16.43	24.51	9.71	0.00	12.71	0.00	141.68	14.17%	135.40
3	896.98	30.70	0.00	37.91	66.77	30.70	14.29	26.70	10.57	0.00	12.66	0.00	136.82	13.68%	113.93
4	852.99	29.19	0.00	36.05	61.77	30.70	12.31	28.63	11.34	0.00	12.59	0.00	132.17	13.22%	103.54
5	810.90	27.75	0.00	34.27	57.13	30.70	10.47	30.31	12.01	0.00	12.50	0.00	127.70	12.77%	94.12
6	770.58	26.37	0.00	32.57	52.85	30.70	8.77	31.78	12.59	0.00	12.40	0.00	123.40	12.34%	85.56
7	731.89	25.05	0.00	30.93	48.88	30.70	7.20	33.03	13.08	0.00	12.29	0.00	119.25	11.92%	77.79
8	694.72	23.77	0.00	29.36	45.22	30.70	5.75	34.10	13.51	0.00	12.15	0.00	115.24	11.52%	70.73
9	658.39	22.53	0.00	27.83	44.62	30.70	5.51	32.16	12.74	0.00	12.01	0.00	111.31	11.13%	64.27
10	622.18	21.29	0.00	26.29	44.62	30.70	5.51	29.62	11.73	0.00	11.84	0.00	107.37	10.74%	58.32
11	585.97	20.05	0.00	24.76	44.62	30.70	5.51	27.09	10.73	0.00	11.66	0.00	103.41	10.34%	52.85
12	549.76	18.81	0.00	23.23	44.62	30.70	5.51	24.56	9.73	0.00	11.45	0.00	99.44	9.94%	47.81
13	513.55	17.57	0.00	21.70	44.62	30.70	5.51	22.02	8.72	0.00	11.23	0.00	95.44	9.54%	43.17
14	477.34	16.33	0.00	20.17	44.62	30.70	5.51	19.49	7.72	0.00	10.98	0.00	91.42	9.14%	38.90
15	441.12	15.10	0.00	18.64	44.62	30.70	5.51	16.95	6.72	0.00	10.71	0.00	87.38	8.74%	34.98
16	404.91	13.86	0.00	17.11	44.62	30.70	5.51	14.42	5.71	0.00	10.42	0.00	83.31	8.33%	31.38
17	368.70	12.62	0.00	15.58	44.62	30.70	5.51	11.89	4.71	0.00	10.10	0.00	79.22	7.92%	28.07
18	332.49	11.38	0.00	14.05	44.62	30.70	5.51	9.35	3.70	0.00	9.76	0.00	75.10	7.51%	25.04
19	296.28	10.14	0.00	12.52	44.62	30.70	5.51	6.82	2.70	0.00	9.39	0.00	70.96	7.10%	22.25
20	260.07	8.90	0.00	10.99	44.62	30.70	5.51	4.28	1.70	0.00	8.99	0.00	66.78	6.68%	19.71
21	223.86	7.67	0.00	9.46	22.31	30.70	(3.32)	24.37	9.65	0.00	8.56	0.00	63.04	6.30%	17.50
22	205.32	7.03	0.00	8.68	0.00	30.70	(12.16)	45.07	17.85	0.00	8.10	0.00	60.19	6.02%	15.72
23	186.78	6.39	0.00	7.89	0.00	30.70	(12.16)	43.77	17.34	0.00	7.61	0.00	57.77	5.78%	14.19
24	168.25	5.76	0.00	7.11	0.00	30.70	(12.16)	42.47	16.82	0.00	7.08	0.00	55.31	5.53%	12.78
25	149.71	5.12	0.00	6.33	0.00	30.70	(12.16)	41.17	16.31	0.00	6.52	0.00	52.82	5.28%	11.49
26	131.17	4.49	0.00	5.54	0.00	30.70	(12.16)	39.88	15.80	0.00	5.92	0.00	50.28	5.03%	10.29
27	112.63	3.85	0.00	4.76	0.00	30.70	(12.16)	38.58	15.28	0.00	5.28	0.00	47.72	4.77%	9.18
28	94.09	3.22	0.00	3.98	0.00	30.70	(12.16)	37.28	14.77	0.00	4.60	0.00	45.11	4.51%	8.17
29	75.55	2.59	0.00	3.19	0.00	30.70	(12.16)	35.99	14.25	0.00	3.88	0.00	42.45	4.25%	7.23
30	57.02	1.95	0.00	2.41	0.00	30.70	(12.16)	34.69	13.74	0.00	3.12	0.00	39.76	3.98%	6.37
31	38.48	1.32	0.00	1.63	0.00	30.70	(12.16)	33.39	13.23	0.00	2.31	0.00	37.02	3.70%	5.58
32	19.94	0.68	0.00	0.84	0.00	30.70	(12.16)	32.09	12.71	0.00	1.45	0.00	34.23	3.42%	4.86
33	1.40	0.05	0.00	0.06	0.00	30.70	(12.16)	30.80	12.20	0.00	0.55	0.00	31.39	3.14%	4.19
34	(17.14)	(0.59)	0.00	(0.72)	0.00	30.70	(12.16)	29.50	11.68	0.00	0.00	0.00	28.91	2.89%	3.63
35	(35.68)	(1.22)	0.00	(1.51)	0.00	30.70	(12.16)	28.20	11.17	0.00	0.00	0.00	26.98	2.70%	3.19
36	(54.22)	(1.86)	0.00	(2.29)	0.00	30.70	(12.16)	26.90	10.66	0.00	0.00	0.00	25.05	2.50%	2.78
37	(72.75)	(2.49)	0.00	(3.07)	0.00	30.70	(12.16)	25.61	10.14	0.00	0.00	0.00	23.12	2.31%	2.42
38	(91.29)	(3.12)	0.00	(3.86)	0.00	30.70	(12.16)	24.31	9.63	0.00	0.00	0.00	21.18	2.12%	2.08
39	(109.83)	(3.76)	0.00	(4.64)	0.00	30.70	(12.16)	23.01	9.11	0.00	0.00	0.00	19.25	1.93%	1.78
40	(128.37)	(4.39)	0.00	(5.43)	0.00	30.70	(12.16)	21.71	8.60	0.00	0.00	0.00	17.32	1.73%	1.51
41	45.14	1.54	0.00	1.91	227.92	0.00	90.28	(224.76)	(89.03)	0.00	0.00	0.00	4.70	0.47%	0.39
42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00

TOTAL		\$451.70	\$0.00	\$557.85	\$1,227.92	\$1,227.92	(\$0.00)	\$923.75	\$365.90	\$0.00	\$293.54	\$0.00	\$2,896.91		1,420
PRESENT WORTH		\$272.14	\$0.00	\$336.09	\$592.33	\$445.35	\$58.22	\$409.54	\$162.22	\$0.00	\$146.42	\$0.00	\$1,420.43	142.04%	
LEVELIZED PAYMENT		\$18.76	\$0.00	\$23.17	\$40.83	\$30.70	\$4.01	\$28.23	\$11.18	\$0.00	\$10.09	\$0.00	\$97.91	9.79%	

Table - 8
Northern Utilities- New Hampshire
Development of Revenue Requirements Stream

Services Investment

Year No.	Rate Base	Interest On Debt	Return On Preferred	Return On Common	Tax Deprec'N	Book Deprec'N	Deferred Tax	Taxable Income	Inc Tax Payable	Revenue Tax	Property Tax	Property Insurance	ANNUAL	% of	Present
													Revenue Req'm Ts	Original Investm'T	Worth Of Rev Req'Mt
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	1,000.00														
1	980.83	33.56	0.00	41.45	37.50	38.89	(8.55)	78.03	27.74	6.00	12.76	0.00	153.85	15.39%	144.75
2	925.62	32.02	0.00	39.54	72.19	38.89	13.19	32.18	12.75	0.00	12.61	0.00	148.99	14.90%	131.87
3	884.62	30.27	0.00	37.39	66.77	38.89	11.05	34.02	13.48	0.00	12.44	0.00	143.50	14.35%	119.50
4	835.67	28.60	0.00	35.32	61.77	38.89	9.06	35.61	14.10	0.00	12.24	0.00	138.21	13.82%	108.28
5	788.64	26.99	0.00	33.33	57.13	38.89	7.23	36.95	14.63	0.00	12.03	0.00	133.10	13.31%	98.10
6	743.37	25.44	0.00	31.42	52.85	38.89	5.53	38.06	15.08	0.00	11.80	0.00	128.15	12.82%	88.86
7	699.74	23.95	0.00	29.57	48.88	38.89	3.96	38.97	15.44	0.00	11.55	0.00	123.35	12.33%	80.47
8	657.62	22.50	0.00	27.79	45.22	38.89	2.51	39.69	15.72	0.00	11.27	0.00	118.68	11.87%	72.84
9	616.34	21.09	0.00	26.05	44.62	38.89	2.27	37.41	14.82	0.00	10.96	0.00	114.08	11.41%	65.87
10	575.19	19.68	0.00	24.31	44.62	38.89	2.27	34.53	13.68	0.00	10.63	0.00	109.46	10.95%	59.46
11	534.03	18.27	0.00	22.57	44.62	38.89	2.27	31.65	12.54	0.00	10.28	0.00	104.81	10.48%	53.56
12	492.87	16.87	0.00	20.83	44.62	38.89	2.27	28.77	11.39	0.00	9.89	0.00	100.14	10.01%	48.15
13	451.71	15.46	0.00	19.09	44.62	38.89	2.27	25.89	10.25	0.00	9.48	0.00	95.44	9.54%	43.17
14	410.56	14.05	0.00	17.35	44.62	38.89	2.27	23.01	9.11	0.00	9.03	0.00	90.70	9.07%	38.60
15	369.40	12.64	0.00	15.61	44.62	38.89	2.27	20.13	7.97	0.00	8.56	0.00	85.94	8.59%	34.41
16	328.24	11.23	0.00	13.87	44.62	38.89	2.27	17.24	6.83	0.00	8.05	0.00	81.14	8.11%	30.56
17	287.09	9.82	0.00	12.13	44.62	38.89	2.27	14.36	5.69	0.00	7.50	0.00	76.30	7.63%	27.04
18	245.93	8.42	0.00	10.39	44.62	38.89	2.27	11.48	4.55	0.00	6.91	0.00	71.43	7.14%	23.81
19	204.77	7.01	0.00	8.65	44.62	38.89	2.27	8.60	3.41	0.00	6.29	0.00	66.52	6.65%	20.86
20	163.61	5.60	0.00	6.91	44.62	38.89	2.27	5.72	2.27	0.00	5.63	0.00	61.57	6.16%	18.17
21	126.88	4.34	0.00	5.36	22.31	38.89	(6.57)	25.46	10.88	0.00	4.93	0.00	57.04	5.70%	15.83
22	98.97	3.39	0.00	4.18	0.00	38.89	(15.40)	45.82	18.15	0.00	4.18	0.00	53.38	5.34%	13.94
23	75.49	2.58	0.00	3.19	0.00	38.89	(15.40)	44.17	17.50	0.00	3.38	0.00	50.14	5.01%	12.32
24	52.00	1.78	0.00	2.38	0.00	38.89	(15.40)	42.53	16.85	0.00	2.54	0.00	46.85	4.68%	10.83
25	28.52	0.98	0.00	1.21	0.00	38.89	(15.40)	40.88	16.19	0.00	1.65	0.00	43.51	4.35%	9.46
26	5.03	0.17	0.00	0.21	0.00	38.89	(15.40)	39.24	15.54	0.00	0.71	0.00	40.12	4.01%	8.21
27	(18.45)	(0.63)	0.00	(0.78)	0.00	38.89	(15.40)	37.60	14.89	0.00	0.00	0.00	36.97	3.70%	7.12
28	(41.94)	(1.44)	0.00	(1.77)	0.00	38.89	(15.40)	35.95	14.24	0.00	0.00	0.00	34.52	3.45%	6.25
29	(65.42)	(2.24)	0.00	(2.76)	0.00	38.89	(15.40)	34.31	13.59	0.00	0.00	0.00	32.07	3.21%	5.46
30	(88.91)	(3.04)	0.00	(3.76)	0.00	38.89	(15.40)	32.67	12.94	0.00	0.00	0.00	29.62	2.96%	4.75
31	(112.39)	(3.85)	0.00	(4.75)	0.00	38.89	(15.40)	31.02	12.29	0.00	0.00	0.00	27.18	2.72%	4.10
32	(135.88)	(4.65)	0.00	(5.74)	0.00	38.89	(15.40)	29.38	11.64	0.00	0.00	0.00	24.73	2.47%	3.51
33	(159.36)	(5.45)	0.00	(6.74)	0.00	38.89	(15.40)	27.74	10.99	0.00	0.00	0.00	22.28	2.23%	2.97
34	(182.85)	(6.26)	0.00	(7.73)	0.00	38.89	(15.40)	26.09	10.34	0.00	0.00	0.00	19.84	1.98%	2.49
35	(206.33)	(7.06)	0.00	(8.72)	0.00	38.89	(15.40)	24.45	9.68	0.00	0.00	0.00	17.39	1.74%	2.05
36	(229.82)	(7.86)	0.00	(9.71)	0.00	38.89	(15.40)	22.81	9.03	0.00	0.00	0.00	14.94	1.49%	1.66
37	(253.30)	(8.67)	0.00	(10.71)	0.00	38.89	(15.40)	21.16	8.38	0.00	0.00	0.00	12.49	1.25%	1.31
38	(276.79)	(9.47)	0.00	(11.70)	0.00	38.89	(15.40)	19.52	7.73	0.00	0.00	0.00	10.05	1.00%	0.99
39	(300.27)	(10.28)	0.00	(12.69)	0.00	38.89	(15.40)	17.88	7.08	0.00	0.00	0.00	7.60	0.76%	0.70
40	(323.76)	(11.08)	0.00	(13.68)	0.00	38.89	(15.40)	16.23	6.43	0.00	0.00	0.00	5.15	0.52%	0.45
41	(347.24)	(11.88)	0.00	(14.68)	0.00	38.89	(15.40)	14.59	5.78	0.00	0.00	0.00	2.71	0.27%	0.22
42	(370.73)	(12.69)	0.00	(15.67)	0.00	38.89	(15.40)	12.94	5.13	0.00	0.00	0.00	0.26	0.03%	0.02
43	(394.21)	(13.49)	0.00	(16.66)	0.00	38.89	(15.40)	11.30	4.48	0.00	0.00	0.00	(2.19)	-0.22%	(0.16)
44	(417.70)	(14.29)	0.00	(17.65)	0.00	38.89	(15.40)	9.66	3.83	0.00	0.00	0.00	(4.64)	-0.46%	(0.32)
45	(441.18)	(15.10)	0.00	(18.65)	0.00	38.89	(15.40)	8.01	3.17	0.00	0.00	0.00	(7.08)	-0.71%	(0.45)
46	148.54	5.08	0.00	6.28	750.00	0.00	297.08	(739.60)	(292.96)	0.00	0.00	0.00	15.48	1.55%	0.93
47	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
48	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
49	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
50	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
51	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
52	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
53	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
54	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
55	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
56	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
57	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
58	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
59	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
60	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
61	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
62	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
63	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
64	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
65	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)

TOTAL		\$252.37	\$0.00	\$311.68	\$1,750.00	\$1,750.00	(\$0.00)	\$516.10	\$204.43	\$0.00	\$217.30	\$0.00	\$2,735.78		1.423
PRESENT WORTH		\$236.56	\$0.00	\$292.15	\$618.94	\$578.33	\$16.09	\$443.16	\$175.54	\$0.00	\$124.29	\$0.00	\$1,422.95	142.29%	
LEVELIZED PAYMENT		\$15.91	\$0.00	\$19.65	\$41.62	\$38.89	\$1.08	\$29.80	\$11.80	\$0.00	\$8.36	\$0.00	\$95.68	9.57%	

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Table - 8
Northern Utilities- New Hampshire
Development of Revenue Requirements Stream

Metering Equipment

Year No.	Rate Base	Interest On Debt	Return On Preferred	Return On Common	Tax Deprec'N	Book Deprec'N	Deferred Tax	Taxable Income	Inc Tax Payable	Revenue Tax	Property Tax	Property Insurance	ANNUAL	% of	Present
													Revenue Reqm'Ts	Original Investm'T	Worth Of Rev Req Mt
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	1,000.00														
1	982.40	33.62	0.00	41.52	37.50	33.68	1.51	64.93	25.72	0.00	12.76	0.00	148.81	14.80%	148.00
2	940.24	32.18	0.00	39.74	72.19	33.68	15.25	27.30	10.61	0.00	12.68	0.00	144.54	14.43%	127.76
3	892.48	30.54	0.00	37.72	66.77	33.68	13.11	29.37	11.63	0.00	13.03	0.00	139.71	13.97%	116.24
4	846.68	28.97	0.00	35.78	61.77	33.68	11.12	31.17	12.35	0.00	13.40	0.00	135.30	13.53%	106.00
5	802.79	27.47	0.00	33.93	57.13	33.68	9.29	32.73	12.96	0.00	13.77	0.00	131.11	13.11%	96.63
6	760.67	26.03	0.00	32.15	52.85	33.68	7.59	34.07	13.49	0.00	14.16	0.00	127.10	12.71%	88.13
7	720.18	24.65	0.00	30.44	48.88	33.68	6.02	35.20	13.94	0.00	14.55	0.00	123.28	12.33%	80.42
8	681.20	23.31	0.00	28.79	45.22	33.68	4.57	36.14	14.31	0.00	14.96	0.00	119.63	11.96%	73.42
9	643.07	22.01	0.00	27.18	44.62	33.68	4.33	34.07	13.50	0.00	15.38	0.00	116.07	11.61%	67.02
10	605.06	20.71	0.00	25.57	44.62	33.68	4.33	31.41	12.44	0.00	15.81	0.00	112.54	11.25%	61.13
11	567.04	19.40	0.00	23.96	44.62	33.68	4.33	28.75	11.39	0.00	16.25	0.00	109.02	10.90%	55.71
12	529.03	18.10	0.00	22.36	44.62	33.68	4.33	26.09	10.33	0.00	16.71	0.00	105.52	10.55%	50.73
13	491.02	16.80	0.00	20.75	44.62	33.68	4.33	23.43	9.28	0.00	17.17	0.00	102.02	10.20%	46.15
14	453.00	15.50	0.00	19.15	44.62	33.68	4.33	20.77	8.22	0.00	17.66	0.00	98.54	9.85%	41.93
15	414.99	14.20	0.00	17.54	44.62	33.68	4.33	18.11	7.17	0.00	18.15	0.00	95.08	9.51%	38.06
16	376.98	12.90	0.00	15.93	44.62	33.68	4.33	15.45	6.12	0.00	18.66	0.00	91.62	9.16%	34.51
17	338.96	11.60	0.00	14.33	44.62	33.68	4.33	12.79	5.07	0.00	19.18	0.00	88.18	8.82%	31.25
18	300.95	10.30	0.00	12.72	44.62	33.68	4.33	10.13	4.01	0.00	19.72	0.00	84.76	8.48%	28.26
19	262.94	9.00	0.00	11.11	44.62	33.68	4.33	7.47	2.96	0.00	20.27	0.00	81.35	8.14%	25.51
20	224.93	7.70	0.00	9.51	44.62	33.68	4.33	4.81	1.90	0.00	20.84	0.00	77.96	7.80%	23.00
21	191.33	6.55	0.00	8.09	22.31	33.68	(4.51)	24.76	9.81	0.00	21.42	0.00	75.04	7.50%	20.83
22	166.57	5.70	0.00	7.04	0.00	33.68	(13.34)	45.34	17.96	0.00	22.02	0.00	73.06	7.31%	19.08
23	146.23	5.00	0.00	6.18	0.00	33.68	(13.34)	43.92	17.40	0.00	22.64	0.00	71.56	7.16%	17.58
24	125.89	4.31	0.00	5.32	0.00	33.68	(13.34)	42.49	16.85	0.00	23.27	0.00	70.07	7.01%	16.20
25	105.55	3.64	0.00	4.46	0.00	33.68	(13.34)	41.07	16.27	0.00	23.92	0.00	68.60	6.86%	14.92
26	85.21	2.92	0.00	3.60	0.00	33.68	(13.34)	39.65	15.70	0.00	24.59	0.00	67.15	6.72%	13.74
27	64.87	2.22	0.00	2.74	0.00	33.68	(13.34)	38.22	15.14	0.00	25.28	0.00	65.72	6.57%	12.65
28	44.53	1.52	0.00	1.88	0.00	33.68	(13.34)	36.80	14.58	0.00	25.99	0.00	64.31	6.43%	11.65
29	24.19	0.83	0.00	1.02	0.00	33.68	(13.34)	35.38	14.01	0.00	26.72	0.00	62.92	6.29%	10.72
30	3.85	0.13	0.00	0.16	0.00	33.68	(13.34)	33.95	13.45	0.00	27.46	0.00	61.55	6.15%	9.86
31	(16.49)	(0.56)	0.00	(0.70)	0.00	33.68	(13.34)	32.53	12.88	0.00	28.23	0.00	60.20	6.02%	9.08
32	(36.84)	(1.26)	0.00	(1.56)	0.00	33.68	(13.34)	31.10	12.32	0.00	29.02	0.00	58.87	5.89%	8.35
33	15.42	0.53	0.00	0.65	77.84	0.00	30.83	(76.76)	(30.40)	0.00	0.00	0.00	1.61	0.16%	0.21
34	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
35	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
36	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
37	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
38	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
39	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
40	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
41	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
42	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
43	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
44	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
45	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
46	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
47	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
48	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
49	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
50	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
51	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
52	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
53	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
54	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
55	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
56	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
57	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
58	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
59	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
60	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
61	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
62	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
63	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
64	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)
65	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	0.00%	(0.00)

TOTAL		\$436.49	\$0.00	\$539.06	\$1,077.84	\$1,077.84	(\$0.00)	\$892.63	\$353.57	\$0.00	\$625.66	\$0.00	\$3,032.61		1,497
PRESENT WORTH		\$264.46	\$0.00	\$326.60	\$584.05	\$459.32	\$49.41	\$416.09	\$164.81	\$0.00	\$232.23	\$0.00	\$1,496.83		149.68%
LEVELIZED PAYMENT		\$19.29	\$0.00	\$23.95	\$42.83	\$33.68	\$3.62	\$30.51	\$12.09	\$0.00	\$17.03	\$0.00	\$109.77		10.98%

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Table - 8
Northern Utilities- New Hampshire
Marginal Cost Study

Development of Weighted Plant Book Lives and Salvage

Line No.	Description	2010 Plant Balance	Average Service Life	Net Salvage Value
	(1)	(2) {1}	(3) {2}	(4) {2}
1				
2				
3				
4				
5	DISTRIBUTION INVESTMENT (excluding Customer Equip)			
6				
7				
8	375-Distribution Structures	2,820,320	60	-5%
9	376-Mains	65,458,022	41	-25%
10	378-Distribution M&R Station Equip.	1,787,578	30	-5%
11	383-Dist. House Regulators	222,731	35	0%
12	386-Dist Water Htrs & Conv. Burners	2,523,018	10	0%
13				
14	Total Distribution Capacity-Related	\$72,811,669	40	-23%
15				
16				
17				
18				
19				
20	380-Services	31,874,279	45	-75%
21				
22	381-Meters	3,506,040	30	0
23	382-Meter Installations	12,313,745	33	-10%
24	Meters	15,819,785	32	-8%
25				
26				
27				
28				
29				
30				

NOTES:

- 1 Test Year Plant balances taken from 2011 Depreciation report.
- 2 Service lives and salvage values based on 2011 depreciation study.

Table - 9
Northern Utilities- New Hampshire
Marginal Cost Study

Summary of Marginal Capacity Costs

Line No.	Description	---- PRODUCTION ----		-----TRANS & DIST-----		Total Dist	Total Prod & Dist
		Supply Related	Transp. Related	Mains Reinforce	Mains Extension		
		(1)	(2)	(3)	(4)	(5)	(6)
PLANT INVESTMENT							
1	Long-Run Unit Costs - \$/Design Day Therms {1}	\$0.00	\$0.00	\$7.66	\$72.58	\$80.24	\$80.24
2	General Plant Loading Factor	4.49%	4.49%	4.49%	4.49%		
3	Unit Costs + Loading Factor (1)+(1)*(2)	0.00	0.00	8.01	75.84	\$83.84	\$83.84
4							
5	Fixed Charge Rate	0.00%	0.00%	7.24%	7.24%		
6	A & G Exp Plant-Related Loading Factor	0.74%	0.74%	0.74%	0.74%		
7	Total Rate (5)+(6)	0.74%	0.74%	7.98%	7.98%		
8							
9	Annualized Cost (3)*(7)	\$0.00	\$0.00	\$0.64	\$6.05	\$6.69	\$6.69
10							
OPERATING EXPENSES							
12	Production capacity costs {2}	\$0.03	\$0.00				\$0.03
13	Distribution capacity costs {3}			\$0.00	\$1.62	\$1.62	\$1.62
14	A&G Exp Non-Plant Loading Factor	146.98%	146.98%	146.98%	146.98%		
15	Total O&M Expense [(12)+(13)]*[1+(14)]	\$0.08	\$0.00	\$0.00	\$4.00	\$4.00	\$4.08
16							
WORKING CAPITAL							
18	Materials & Supplies + Prepayments Rate {4}	1.34%	1.34%	1.34%	1.34%		
19	M&S Cost (3)*(17)	0.00	0.00	0.11	1.01	\$1.12	\$1.12
20	Working Cash O&M Allowance {5} [(9)+(15)]*12.33%	0.01	0.00	0.08	1.24	\$1.32	\$1.33
21	Total Working Capital (19)+(20)	\$0.01	\$0.00	\$0.19	\$2.25	\$2.44	\$2.45
22							
23	Working Capital Rev. Req'd {6} (21)*10.42%	\$0.00	\$0.00	\$0.02	\$0.23	\$0.25	\$0.26
24							
25	System Seasonal Capacity Related Cost {9}						
26	\$/Design Day Therms (9)+(15)+(23)	\$0.00	\$0.00	\$0.66	\$10.28	\$10.94	\$10.94
27							
28	Loss Factor {7}	0.005	0.005	0.005	0.005	0.005	0.005
29	Inflation Adjustment {8}	4.26%	4.26%	4.26%	4.26%	4.26%	4.26%
30							
31	Seasonal Capacity Cost (26)*[1+(28)]/(29)	\$0.00	\$0.00	\$0.69	\$10.78	\$11.46	\$11.46

NOTES:

- Sources: Production taken from Table - 1, Page 1. Distribution taken from Table - 2, page 1.
- Source: Table - 4, page 2.
- Source: Table - 5, page 1.
- Source: Table - 7, page 2.
- Working cash computed on the basis of 45 days.
- Revenue requirement for working cash computed as the after tax cost of capital, i.e debt costs plus equity costs increased by taxes equals 10.42%.
- Source File: NUI Loss Analysis.xls
- Inflation adjustment to restate marginal costs to rate year dollars $(1+0.023)^{\{(10/31/2012-12/31/2010)/365\}}-1$
- Supply capacity costs set to zero since they are not applicable to delivery marginal costs

Table - 10
Northern Utilities- New Hampshire
Marginal Cost Study

Summary of Marginal Commodity Costs

Line No.	Description	----- Residential -----		----- Small C&I -----		----- Medium C&I -----		----- Large C&I -----	
		ResNonHt&LI	ResHt&LI	SmHiW	SmLoW	MdHiW	MdLoW	LgHiW	LgLoW
		R-6&R-11	R-5&R-10	G-40	G-50	G-41	G-51	G-42	G-52
1	PLANT INVESTMENT								
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									

MARGINAL COMMODITY COSTS NOT COMPUTED FOR DISTRIBUTION MARGINAL COST STUDY

Table - 11
Northern Utilities- New Hampshire
Marginal Cost Study

Summary of Marginal Customer Costs

Line No.	Description	----- Residential -----		----- Small C&I -----		----- Medium C&I -----		----- Large C&I -----		
		ResNonHt&LI R-6&R-11	ResHt&LI R-5&R-10	SmHiW G-40	SmLoW G-50	MdHiW G-41	MdLoW G-51	LgHiW G-42	LgLoW G-52	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
PLANT INVESTMENT										
1	Meters and Regulators {1}	\$460.51	\$460.51	\$3,100.96	\$3,100.96	\$6,771.92	\$6,771.92	\$12,046.10	\$12,046.10	
2	General Plant Loading Factor {2}	4.49%	4.49%	4.49%	4.49%	4.49%	4.49%	4.49%	4.49%	
3	Unit Costs + Loading Factor (1)+(1)*(2)	481.20	481.20	3,240.27	3,240.27	7,076.16	7,076.16	12,587.29	12,587.29	
4	Fixed Charge Rate {3}	8.46%	8.46%	8.46%	8.46%	8.46%	8.46%	8.46%	8.46%	
5	Meters Carrying Costs (3)*(4)	40.72	40.72	274.19	274.19	598.77	598.77	1,065.11	1,065.11	
6	Services {1}	3,035.34	3,035.34	3,701.52	3,701.52	7,423.90	7,423.90	34,415.64	34,415.64	
7	General Plant Loading Factor {2}	4.49%	4.49%	4.49%	4.49%	4.49%	4.49%	4.49%	4.49%	
8	Unit Costs + Loading Factor (6)+(6)*(7)	3,171.70	3,171.70	3,867.82	3,867.82	7,757.43	7,757.43	35,961.81	35,961.81	
9	Fixed Charge Rate {3}	6.92%	6.92%	6.92%	6.92%	6.92%	6.92%	6.92%	6.92%	
10	Services Carrying Costs (8)*(9)	219.37	219.37	267.52	267.52	536.54	536.54	2,487.28	2,487.28	
11										
12	Total Plant Carrying Costs (5)+(10)	\$260.09	\$260.09	\$541.70	\$541.70	\$1,135.31	\$1,135.31	\$3,552.39	\$3,552.39	
13										
14	A & G Exp Plant-Related Loading Factor {4}	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	0.74%	
15										
16	Annualized Cost (100%+(14))*(12)	\$262.01	\$262.01	\$545.71	\$545.71	\$1,143.72	\$1,143.72	\$3,578.71	\$3,578.71	
17										
18										
19	OPERATING EXPENSES									
20	Plant Related O&M \$/Customer {5}	\$36.51	\$36.51	\$71.05	\$71.05	\$148.27	\$148.27	\$485.29	\$485.29	
21	Customer Acctg & Mktg Expenses {6}	\$42.15	\$42.07	\$46.88	\$47.23	\$68.21	\$67.80	\$96.28	\$136.14	
22	A&G Exp Non-Plant Loading Factor {4}	146.98%	146.98%	146.98%	146.98%	146.98%	146.98%	146.98%	146.98%	
23	Total O&M Expense (20+21+[20+21]*22)	\$194.28	\$194.08	\$291.27	\$292.14	\$534.69	\$533.67	\$1,436.38	\$1,534.84	
24										
25	WORKING CAPITAL - \$/Customer									
26	Materials & Supplies + Prepayments Rate {3}	1.34%	1.34%	1.34%	1.34%	1.34%	1.34%	1.34%	1.34%	
27	M&S Cost [(3)+(8)]*(26)	48.84	48.84	95.04	95.04	198.33	198.33	649.13	649.13	
28	Working Cash O&M Allowance {7} [(16)+(34)]*12.33%	56.26	56.23	103.19	103.30	206.93	206.80	618.30	630.44	
29	Total Working Capital (27)+(28)	\$105.10	\$105.07	\$198.23	\$198.34	\$405.26	\$405.13	\$1,267.42	\$1,279.56	
30	{8}									
31	Working Capital Rev. Requirement (29)* 10.42%	\$10.95	\$10.95	\$20.66	\$20.67	\$42.23	\$42.22	\$132.07	\$133.33	
32										
33	Annual Customer Related Cost	\$467.25	\$467.04	\$857.64	\$858.53	\$1,720.64	\$1,719.61	\$5,147.16	\$5,246.88	
34	\$/Customer (16)+(23)+(31)									
35	Inflation Adjustment {9}	4.26%	4.26%	4.26%	4.26%	4.26%	4.26%	4.26%	4.26%	
36										
37	Annual Customer Related Cost (33)*[1+(35)]	\$487.16	\$486.95	\$894.20	\$895.12	\$1,793.98	\$1,792.90	\$5,366.55	\$5,470.52	

NOTES:

- Meter investment from Table - 3, Page 1.
- Source: Table - 7, page 2.
- Source: Table - 8, page 1.
- Source: Table - 7, page 1.
- Source: Table - 6, page 2.
- Source: Table - 6, page 4.
- Working cash computed on the basis of 45. days net lag.
- Revenue requirement for working cash computed as tax rate divided by 1 minus tax rate multiplied by the cost of equity all added to the cost of capital.
- Source: Price escalation to mid-point of rate year.

001114

Table - 12
Northern Utilities- New Hampshire
Marginal Cost Study
Summary of Marginal Cost Estimates

Line No.	Description	Residential		Small C&I		Medium C&I		Large C&I		Total Company
		ResNonHt&Ll R-6&R-11	ResHt&Ll R-5&R-10	SmHiW G-40	SmLoW G-50	MdHiW G-41	MdLoW G-51	LgHiW G-42	LgLoW G-52	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	UNCOLLECTIBLE FACTOR	0.81%	1.85%	0.17%	0.21%	0.20%	0.11%	0.01%	0.00%	
2										
3	CUSTOMER CHARGE \$'s per month									
4	Customer Charge w/o Uncollectibles	\$40.60	\$40.58	\$74.52	\$74.59	\$149.50	\$149.41	\$447.21	\$455.88	
5	Adjustment for Uncollectibles (1)*(4)	0.33	0.75	0.12	0.15	0.30	0.16	0.04	0.00	
6	Customer Charge Incl. Uncollectibles (4)+(5)	\$40.93	\$41.33	\$74.64	\$74.75	\$149.80	\$149.57	\$447.25	\$455.88	
7										
8	WINTER CHARGES									
9	Gas Supply Demand Charge, Design Day (3)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
10	Delivery Demand Charge - Pressure Support (2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
11	Delivery Demand Charge - Reinforcements (2)	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	
12	Delivery Demand Charge - Main Extensions (2)	10.78	10.78	10.78	10.78	10.78	10.78	10.78	10.78	
13	Adjustment for Uncollectibles [(9)+(10)+(11)+(12)]*(1)	0.09	0.21	0.02	0.02	0.02	0.01	0.00	0.00	
14	Winter Charges Incl. Uncollectibles (13)+(14)	\$11.56	\$11.68	\$11.48	\$11.49	\$11.49	\$11.48	\$11.47	\$11.46	
15										
16	Supply Commodity Charge \$'s per Therms (3)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
17	Adjustment for Uncollectibles (1)*(16)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
18	Supply Commodity Charge Incl. Uncollectibles (17)+(18)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
19										
20	SUMMER CHARGES									
21	Demand Charge \$'s per Design Day Therm (2)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
22	Delivery Demand Charge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
23	Adjustment for Uncollectibles [(21)+(22)]*(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
24	Summer Charges Incl. Uncollectibles	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
25										
26	Commodity Charge \$'s per Therms (3)	\$0.00	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	
27	Adjustment for Uncollectibles (1)*(26)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
28	Commodity Charge Incl. Uncollectibles (26)+(27)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
29										
30	CALENDAR MONTH BILLING DETERMINANTS (2010)									
31	Customers	1,653	20,262	4,416	969	543	234	30	27	28,134
32	Design Day Therms -Sales & Transp	2,492	168,098	100,487	12,439	112,415	21,124	48,711	60,320	526,087
33	Winter Therms -Sales & Transp	242,651	12,947,562	7,326,994	1,351,750	8,741,511	2,312,830	3,926,891	6,934,231	43,784,420
34	Summer Therms -Sales & Transp	118,757	2,871,684	1,183,653	859,566	2,043,743	1,546,729	1,536,441	4,456,197	14,616,770
35										
36	REVENUES RESULTING FROM FULL MARGINAL COST PRICING									
37	Total Customer Related (6)*(31)*12 Mos	\$811,848	\$10,049,344	\$3,955,065	\$869,140	\$975,429	\$420,398	\$161,443	\$147,552	17,390,219
38										
39	Winter									
40	Winter Supply Capacity Cost (1+(1))*(9)*(32)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
41	Winter Delivery Pressure Support (1+(1))*(10)*(32)	0	0	0	0	0	0	0	0	0
42	Winter Delivery Reinforcements (1+(1))*(11)*(32)	1,732	118,035	69,391	8,593	77,655	14,579	33,585	41,585	365,157
43	Winter Delivery Main Ext. (1+(1))*(12)*(32)	27,070	1,844,819	1,084,542	134,311	1,213,695	227,860	524,913	649,954	5,707,164
44	Winter Supply Commodity (1+(1))*(16)*(33)	0	0	0	0	0	0	0	0	0
45	Total Winter (40)+(41)+(42)+(43)+(44)	\$28,802	\$1,962,854	\$1,153,933	\$142,904	\$1,291,350	\$242,439	\$558,498	\$691,540	\$6,072,321
46										
47	Summer									
48	Summer Supply Demand (1+(1))*(21)*(32)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
49	Delivery Demand Charge (1+(1))*(22)*(34)	0	0	0	0	0	0	0	0	0
50	Summer Supply Commodity (1+(1))*(26)*(34)	0	0	0	0	0	0	0	0	0
51	Total Summer	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
52										
53	Customer Subtotal (37)	811,848	10,049,344	3,955,065	869,140	975,429	420,398	161,443	147,552	17,390,219
54	Supply Subtotal (40)+(44)+(48)+(50)	0	0	0	0	0	0	0	0	0
55	Delivery Subtotal (41)+(42)+(43)+(49)	28,802	1,962,854	1,153,933	142,904	1,291,350	242,439	558,498	691,540	6,072,321
56	Total Marginal Annual Cost	\$840,650	\$12,012,199	\$5,108,998	\$1,012,044	\$2,266,779	\$662,837	\$719,941	\$839,092	\$23,462,540

NOTES:

- Source: Table 11, page 1, line (37)/12
- Source: Table - 9, page 1.
- Source: Table - 10, page 1."These values are zeroed out so production capacity costs that are recovered through the Cost of Gas Factor are excluded from delivery marginal costs.

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Table - 13
Northern Utilities- New Hampshire
Marginal Cost Study

Marginal Unit Costs per Therms

Line No.	Description	----- Residential -----		----- Small C&I -----		----- Medium C&I -----		----- Large C&I -----	
		ResNonHt&Lj R-6&R-11	ResHt&Lj R-5&R-10	SmHiW G-40	SmLoW G-50	MdHiW G-41	MdLoW G-51	LgHiW G-42	LgLoW G-52
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	CUSTOMER CHARGE								
2	Customer Charge (w/ Uncoll) \$'s per Month	\$40.926	\$41.331	\$74.640	\$74.746	\$149.797	\$149.574	\$447.251	\$455.877
3									
4									
5	WINTER CHARGES {1}								
6	Winter Supply Capacity Cost	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000
7	Winter Delivery Pressure Support	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000
8	Winter Delivery Reinforcements	\$0.0071	\$0.0091	\$0.0095	\$0.0064	\$0.0089	\$0.0063	\$0.0086	\$0.0060
9	Winter Delivery Main Ext.	\$0.1116	\$0.1425	\$0.1480	\$0.0994	\$0.1388	\$0.0985	\$0.1337	\$0.0937
10	Winter Supply Commodity	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000
11									
12									
13	SUMMER CHARGES {1}								
14	Supply Demand Charge	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000
15	Delivery Demand Charge	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000
16	Commodity Charge \$'s per Therms	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000
17									
18	TOTAL CHARGES								
19	<u>Supply Costs</u>								
20	Customer	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
21	Winter, \$/Therm	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000
22	Summer, \$/Therm	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000
23	Annual Avg. \$/Therm	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000
24									
25	<u>Delivery</u>								
26	Customer (2)	\$40.93	\$41.33	\$74.64	\$74.75	\$149.80	\$149.57	\$447.25	\$455.88
27	Winter, \$/Therm (7)+(8)+(9)	\$0.1187	\$0.1516	\$0.1575	\$0.1057	\$0.1477	\$0.1048	\$0.1422	\$0.0997
28	Summer, \$/Therm (15)	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000
29	Annual Avg. \$/Therm	\$0.0797	\$0.1241	\$0.1356	\$0.0646	\$0.1197	\$0.0628	\$0.1022	\$0.0607
30									
31	TEST YEAR CALENDAR MONTH BILLING DETERMINANTS - SALES and TRANSPORTATION LOADS (All Firm Loads)								
32	Customers	1,653	20,262	4,416	969	543	234	30	27
33	Design Day Therms	2,492	168,098	100,487	12,439	112,415	21,124	48,711	60,320
34	Winter Therms	242,651	12,947,562	7,326,994	1,351,750	8,741,511	2,312,830	3,926,891	6,934,231
35	Summer Therms	118,757	2,871,684	1,183,653	859,566	2,043,743	1,546,729	1,536,441	4,456,197
36	Total Annual Therms	361,408	15,819,246	8,510,647	2,211,315	10,785,254	3,859,559	5,463,332	11,390,428

NOTES:

1 Source: Table - 12 revenues divided by billing month normalized determinants.

Table - 14
Northern Utilities- New Hampshire
Marginal Cost Study

Derivation of Marginal Prices Equi-Propportionately Constrained by Embedded Costs

Line No.	Description	----- Residential -----		----- Small C&I -----		----- Medium C&I -----		----- Large C&I -----		Total Company	
		ResNonHt&LI R-6&R-11	ResHt&LI R-5&R-10	SmHiW G-40	SmLoW G-50	MdHiW G-41	MdLoW G-51	LgHiW G-42	LgLoW G-52		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
1	Estimated Delivery Revenue Req'm'ts	{1}								\$20,968,864	
2	Total Marginal Annual Revenue Requirements	{2}	840,650	12,012,199	5,108,998	1,012,044	2,266,779	662,837	719,941	839,092	23,462,540
3	Difference	{1} - {2}									(2,493,675)
4	% Difference	{3}/(2)									-10.63%
5	Equi-proportional Adjustment	{2} x {4}	(89,347)	(1,276,696)	(543,001)	(107,563)	(240,921)	(70,448)	(76,518)	(89,181)	(2,493,675)
6	Marginal Cost Constrained to Allowed Revenues	{2} + {5}	751,303	10,735,503	4,565,997	904,481	2,025,858	592,388	643,423	749,911	20,968,864
7											
8	Marginal Unit Prices	Unit Costs from									
9	Customer	Table 14 X	\$36.58	\$36.94	\$66.71	\$66.80	\$133.88	\$133.68	\$399.72	\$407.42	
10		[1+ (4)]									
11	WINTER CHARGES										
12	Winter Supply Capacity Cost	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	
13	Winter Delivery Pressure Support	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	
14	Winter Delivery Reinforcements	\$0.0064	\$0.0081	\$0.0085	\$0.0057	\$0.0079	\$0.0056	\$0.0076	\$0.0076	\$0.0054	
15	Winter Delivery Main Ext.	\$0.0997	\$0.1273	\$0.1323	\$0.0888	\$0.1241	\$0.0880	\$0.1195	\$0.0838	\$0.0838	
16	Winter Supply Commodity	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	
17		\$0.1061	\$0.1355	\$0.1408	\$0.0945	\$0.1320	\$0.0937	\$0.1271	\$0.0891	\$0.0891	
18											
19	SUMMER CHARGES										
20	Supply Demand Charge	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	
21	Delivery Demand Charge	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	
22	Commodity Charge \$'s per Therms	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	
23		\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	
24	TOTAL CHARGES										
25	Supply Costs										
26	Customer	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
27	Winter, \$/Therm	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	
28	Summer, \$/Therm	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	
29	Annual Avg, \$/Therm	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0000	
30											
31											
32	Delivery										
33	Customer Charges	\$36.58	\$36.94	\$66.71	\$66.80	\$133.88	\$133.68	\$399.72	\$407.42	\$407.42	
34	Winter, \$/Therm	\$0.1061	\$0.1355	\$0.1408	\$0.0945	\$0.1320	\$0.0937	\$0.1271	\$0.0891	\$0.0891	
35	Summer, \$/Therm	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	<u>\$0.0000</u>	
36	Annual Avg, \$/Therm	\$0.0712	\$0.1109	\$0.1212	\$0.0578	\$0.1070	\$0.0561	\$0.0914	\$0.0543	\$0.0543	
37	or										
38	Facilities Charge, \$/Month	(6) / Annual bills \$	37.87 \$	44.15 \$	86.17 \$	77.79 \$	311.11 \$	210.77 \$	1,782.50 \$	2,316.92	

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Table - 14
Northern Utilities- New Hampshire
Marginal Cost Study

Derivation of Marginal Prices Inverse Elasticity Constrained by Embedded Costs

Line No.	Description	----- Residential -----		----- Small C&I -----		----- Medium C&I -----		----- Large C&I -----		Total Company	
		ResNonHt&LI R-6&R-11	ResHt&LI R-5&R-10	SmHiW G-40	SmLoW G-50	MdHiW G-41	MdLoW G-51	LgHiW G-42	LgLoW G-52		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
	MARGINAL COSTS										
1	Marginal Customer Related Costs	{2}	\$811,848	\$10,049,344	\$3,955,065	\$869,140	\$975,429	\$420,398	\$161,443	\$147,552	\$17,390,219
2	Total Marginal Annual Revenue Requirements	{2}	840,650	12,012,199	5,108,998	1,012,044	2,266,779	662,837	719,941	839,092	\$23,462,540
3	Non-Customer Costs	{2}-(1)	\$28,802	\$10,049,344	\$3,955,065	\$869,140	\$975,429	\$420,398	\$161,443	\$147,552	\$16,607,173
4											
5	RECONCILIATION										
6	Total Estimated Delivery Revenue Requirments										20,968,864
7	Customer Cost Adjusted to Meet Rev Req'd	{6}-(3)									4,361,691
8	Constrained Customer Revenues	{1}*(7)/(1)	203,622	2,520,505	991,981	217,991	244,650	105,441	40,492	37,008	
9											
10	CUSTOMER CHARGE (If allowed to be negative)										
11	Average Number of Monthly Bills		1,653	20,262	4,416	969	543	234	30	27	28,134
12	Customer Charge (w/ Uncoll) \$'s per Month	{8}/(11)/12	\$10.26	\$10.37	\$18.72	\$18.75	\$37.57	\$37.51	\$112.18	\$114.34	\$12.92
13											
14	CUSTOMER CHARGE (If constrained to be non-negative)		NOT APPLICABLE								
15	Customer Charge (w/ Uncoll) \$'s per Month		\$10.26	\$10.37	\$18.72	\$18.75	\$37.57	\$37.51	\$112.18	\$114.34	\$12.92
16	Customer-Related Revenue	{11}*(15)*12 Months	\$203,622	\$2,520,505	\$991,981	\$217,991	\$244,650	\$105,441	\$40,492	\$37,008	\$4,361,691
17	Adjmt to Winter Demand Charge	{8}-(16) {4}	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
18	Adjmt to Winter Demand Chrg, \$/Therms										
19											
20	WINTER CHARGES (Adjusted for Non-negative Customer Charge)										
21	Winter Billing Units		242,651	12,947,562	7,326,994	1,351,750	8,741,511	2,312,830	3,926,891	6,934,231	43,784,420
22	Marginal Winter Demand Charge Revenues (Unadjusted)		0	0	0	0	0	0	0	0	0
23	Adjusted Winter Demand Revenue	{33}-(37)	0	0	0	0	0	0	0	0	0
24	Adjusted Winter Demand Rate	{38}/(36)	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
	Commodity Charge	{18}	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
	Total Winter	{39}+(40)	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000

NOTES:

- 1 Source: Company's Accounting Cost Study
- 2 Source: Table - 12.
- 3 Source: Table - 13.
- 4 Assumes the Demand Charge is the second least elastic component of rates

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