Pennichuck Water Works, Inc.
DW 21-134

Petition For Emergency Temporary Rates
Responses to DOE Data Requests – Set 2

Date Request Received: 10/28/21 Date of Response: 10/29/21
Request No. DOE 2-1 Witness: Donald L. Ware

REQUEST: **Re: Sworn Direct Prefiled Testimony of Donald L. Ware (Ware Testimony): Bates Page 21, Lines 2-3, and Bates Page 28 (Attachment DLW-1), Lines 17 and 21**: The Energy Supply charge per KWH is projected to increase from $0.0695 in 2021 to $0.1200 in 2022 - an increase of 73%. Please provide a detailed explanation for this projected substantial increase.

RESPONSE:

First, the MVD wanted a high-water mark for what PWW thought could happen to rates so they could calculate how long they take water at that rate before they ran out of funds which would result in their having to stop taking water from PWW. With that directive from PWW Attachment DLW-1 was built to account for a high level of conservatism in pricing that PWW did not know yet. PWW had gone out for preliminary quotes on power and the best pricing it got on its first probe about a month ago was just under $0.11 per KWh for a supply charge. Unitil just recently sought and got a default supply rate of over $0.16 per KWh approved. With those two points in view I used $0.12 per KWh for a projected supply charge. On Tuesday of this week we accepted formal power proposals for the Energy supply charge and the low proposal came in at $0.0902 per KWh from Constellation New Energy for the period from 01/02/2022 through 12/01/2023. The month of December's power will be purchased from PSNH at its current Energy Supply charge default rate of $0.09855 per KWh for the month of December. Please see Attachment DOE2-1 for a copy of the above referenced contract. I have changed the rate on DLW Attachment 1 to reflect the now known Energy Supply rate of $0.0902 per KWh that will be in effect the majority of the time that the proposed emergency rate is in effect.

Pennichuck Water Works, Inc
DW21-134
Projected WTP Variable Production Expenses
Attachment DOE 2-1
10/25/2021

Variable Costs of Production:

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	12 month average
WTP finished water production per month in millions of gallons -	281.05	252.30	278.19	280.53	395.39	460.98	513.43	491.17	432.69	326.06	271.14	277.10	
Projected 2022 Electric Costs per million gallons -	$ 169	$ 179	$ 160	$ 174	$ 156	$ 157	$ 162	$ 162	$ 151	$ 158	$ 160	$ 161	
Projected 2022 Chemical Costs (including residuals disposal) per million gallons -	$ 374	$ 374	$ 374	$ 374	$ 373	$ 374	$ 401	$ 401	$ 401	$ 374	$ 373	$ 374	
Total Variable Costs (not including Merrimack River station electricity) per MG -	$ 542	$ 552	$ 533	$ 548	$ 529	$ 531	$ 563	$ 563	$ 552	$ 532	$ 533	$ 535	$ 543
Merrimack River Electric cost/mg of finished water -	$ 99	$ 117	$ 110	$ 113	$ 92	$ 134	$ 103	$ 109	$ 70	$ 93	$ 127	$ 94	$ 105
Total Variable Costs w/ Merrimack River per MG before GAC consideration -	$ 642	$ 669	$ 643	$ 661	$ 621	$ 665	$ 667	$ 672	$ 622	$ 625	$ 661	$ 630	$ 648
Variable Cost/CCF w/ Merrimack River before GAC consideration -	$ 0.48	$ 0.50	$ 0.48	$ 0.49	$ 0.46	$ 0.50	$ 0.50	$ 0.50	$ 0.47	$ 0.47	$ 0.49	$ 0.47	$ 0.48

GAC Analysis

	2016	2017	2018	2019	2020	Total in five years	Average /year
Millions of gallons processed through WTP/year -	4,870	4,308	4,256	3,997	4,423	21,854	4,371
Millions of gallons through an individual filter -	406	359	355	333	369	1,821	364
qty. of media in each filter in Cubic feet -	2,460						
qty of media in all 12 filters -	29,520						
Life span of filter media in months -	18						
Average flow through an individual filter per year in million gallons -	364						
Average flow through an individual filter per month in million gallons -	30.4						
Replacement cost per pound of virgin GAC -	$ 1.77						
average unit weight of dry GAC in pounds/cubic foot -	30.5						
Cost per cu/ft virgin GAC -	$ 53.99						
Cost/filter bed with virgin GAC -	$ 132,803						
Cost for 12 filters virgin GAC -	$ 1,593,637						
Cost per million gallons of water processed during media lifespan, Virgin GAC -	**$ 243.08**						
Cost per CCF, Virgin GAC -	**$ 0.18**						

Projected 2022 Plant Variable Costs w/ Virgin GAC	
per MG	**$ 891.20**
per CCF	**$ 0.66**

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Gallons Pumped in millions of gallons -			281.05	252.30	278.19	280.53	395.39	460.98	513.43	491.17	432.69	326.06	271.14	277.10	**4,260**
KWH consumed per month @ WTP -			333,747	300,348	303,316	335,021	390,804	463,419	549,011	539,181	434,684	342,736	292,094	303,991	**4,588,352**
KW Demand (peak value per month) -			486	558	506	558	900	1057	1126	993	852	658	518	519	
			$ 190.14	$ 190.14	$ 190.14	$ 190.14	$ 190.14	$ 190.14	$ 190.14	$ 190.14	$ 190.14	$ 190.14	$ 190.14	$ 190.14	
	Jan. - June	July - Dec													
First 100 KW	$ 6.070000	$ 6.070000	$ 607.00	$ 607.00	$ 607.00	$ 607.00	$ 607.00	$ 607.00	$ 607.00	$ 607.00	$ 607.00	$ 607.00	$ 607.00	$ 607.00	
following KW	$ 5.810000	$ 5.810000	$ 2,242.66	$ 2,660.98	$ 2,360.80	$ 2,658.08	$ 4,648.97	$ 5,559.20	$ 5,963.00	$ 5,190.27	$ 4,368.15	$ 3,243.43	$ 2,427.13	$ 2,435.84	
	$ 10.400000	$ 10.400000	$ 5,054.40	$ 5,803.20	$ 5,265.87	$ 5,798.00	$ 9,361.73	$ 10,991.07	$ 11,713.87	$ 10,330.67	$ 8,859.07	$ 6,845.80	$ 5,384.60	$ 5,400.20	
	$ 0.650000	$ 0.650000	$ 315.90	$ 362.70	$ 329.12	$ 362.38	$ 585.11	$ 686.94	$ 732.12	$ 645.67	$ 553.69	$ 427.86	$ 336.54	$ 337.51	
First 200K KWH	$ 0.006500	$ 0.006500	$ 1,300.00	$ 1,300.00	$ 1,300.00	$ 1,300.00	$ 1,300.00	$ 1,300.00	$ 1,300.00	$ 1,300.00	$ 1,300.00	$ 1,300.00	$ 1,300.00	$ 1,300.00	
Following KWH	$ 0.005540	$ 0.005540	$ 740.96	$ 555.93	$ 572.37	$ 748.02	$ 1,057.06	$ 1,459.34	$ 1,933.52	$ 1,879.06	$ 1,300.15	$ 790.76	$ 510.20	$ 576.11	
	$ 0.006430	$ 0.006430	$ 2,146.00	$ 1,931.24	$ 1,950.32	$ 2,154.19	$ 2,512.87	$ 2,979.79	$ 3,530.14	$ 3,466.93	$ 2,795.02	$ 2,203.79	$ 1,878.16	$ 1,954.66	
	$ 0.007430	$ 0.007430	$ 2,479.74	$ 2,231.59	$ 2,253.64	$ 2,489.21	$ 2,903.68	$ 3,443.20	$ 4,079.15	$ 4,006.11	$ 3,229.70	$ 2,546.53	$ 2,170.26	$ 2,258.66	
			$ 698.64	$ 698.64	$ 698.64	$ 698.64	$ 698.64	$ 698.64	$ 698.64	$ 698.64	$ 698.64	$ 698.64	$ 698.64	$ 698.64	
12/1/19 - 11/30/21	$ 0.069500	$ 0.069500	$ 23,195.44	$ 20,874.19	$ 21,080.48	$ 23,283.97	$ 27,160.91	$ 32,207.63	$ 38,156.24	$ 37,473.06	$ 30,210.54	$ 23,820.13	$ 20,300.51	$ 21,127.39	
Total Electric cost/month WTP based on 2021 electric rate of -			**$ 38,970.88**	**$ 37,215.61**	**$ 36,608.38**	**$ 40,289.61**	**$ 51,026.11**	**$ 60,122.95**	**$ 68,903.81**	**$ 65,787.54**	**$ 54,112.10**	**$ 42,674.07**	**$ 35,803.17**	**$ 36,886.16**	**$ 568,400.39**
2021 WTP Electric Cost/MG/Month -			**$ 138.66**	**$ 147.50**	**$ 131.60**	**$ 143.62**	**$ 129.05**	**$ 130.43**	**$ 134.20**	**$ 133.94**	**$ 125.06**	**$ 130.88**	**$ 132.04**	**$ 133.11**	**$ 134.17**
														Rate per KWH -	$ 0.1239
$ 0.0902			$ 30,104.01	$ 27,091.40	$ 27,359.13	$ 30,218.91	$ 35,250.56	$ 41,800.41	$ 49,520.77	$ 48,634.10	$ 39,208.50	$ 30,914.75	$ 26,346.84	$ 27,420.01	
10.00%			$ 17,333.97	$ 17,956.54	$ 17,061.67	$ 18,687.19	$ 26,232.70	$ 30,687.84	$ 33,803.31	$ 31,126.92	$ 26,272.70	$ 20,720.33	$ 17,033.91	$ 17,315.63	
Total Electric cost/month WTP based on 2021 electric rate of -			**$ 47,437.98**	**$ 45,047.94**	**$ 44,420.80**	**$ 48,906.10**	**$ 61,483.27**	**$ 72,488.25**	**$ 83,324.08**	**$ 79,761.01**	**$ 65,481.21**	**$ 51,635.08**	**$ 43,380.76**	**$ 44,735.64**	**$ 688,102.11**
2021 WTP Electric Cost/MG/Month -			**$ 168.79**	**$ 178.55**	**$ 159.68**	**$ 174.33**	**$ 155.50**	**$ 157.25**	**$ 162.29**	**$ 162.39**	**$ 151.34**	**$ 158.36**	**$ 159.99**	**$ 161.44**	**$ 162.49**
														Rate per KWH -	$ 0.1500
													Projected increase in Electrical Costs -		21.1%

Merrimack River Pumps station:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Estimated total monthly cost @ 2021 Rates -	$ 22,874.99	$ 24,442.62	$ 25,222.19	$ 26,145.22	$ 30,070.71	$ 51,355.63	$ 43,795.08	$ 44,000.00	$ 25,000.00	$ 25,087.72	$ 28,511.19	$ 21,571.04
Estimated total monthly cost @ 2022 Rates -	$ 27,844.98	$ 29,586.77	$ 30,604.74	$ 31,736.74	$ 36,233.32	$ 61,917.78	$ 52,960.56	$ 53,345.73	$ 30,252.57	$ 30,355.82	$ 34,545.46	$ 26,161.42
Estimated Merrimack River 2022 Electric cost/mg -	**$ 99.07**	**$ 117.27**	**$ 110.01**	**$ 113.13**	**$ 91.64**	**$ 134.32**	**$ 103.15**	**$ 108.61**	**$ 69.92**	**$ 93.10**	**$ 127.41**	**$ 94.41**

Pennichuck Water Works, Inc
DW21-134
Projected Chemcial Production Expenses
Attachment DOE 2-1
10/25/2021

Chemical Quantities (lbs)

					January	February	March	April	May	June	July	August	September	October	November	December	
2021 proformed WTP Pumpage in millions of gallons					281.1	252.3	278.2	280.5	395.4	461.0	513.4	491.2	432.7	326.1	271.1	277.1	4260
	Chemical Dose (PPM)																Annual Total in lbs
	qtr. 1	qtr. 2	qtr. 3	qtr. 4													
Sodium Permanganate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50% Caustic Soda coag. pH adjust	10	10	15	10	23439.7368	21041.9868	23200.8792	23396.3688	32975.526	38445.3984	64230.093	61445.1168	54129.519	27193.2372	22613.4096	23110.4736	415300
Carbon Dioxide			0		0	0	0	0	0	0	0	0	0	0	0	0	0
Ferric Chloride	35	35	40	35	82039.0788	73646.9538	81203.0772	81887.2908	115414.341	134558.894	171280.248	163853.645	144345.384	95176.3302	79146.9336	80886.6576	1303500
Polymer	0.3	0.3	0.3	0.3	703.192104	631.259604	696.026376	701.891064	989.26578	1153.36195	1284.60186	1228.90234	1082.59038	815.797116	678.402288	693.314208	10700
Sodium Hypochlorite	2.5	2.5	2.5	2.5	5859.9342	5260.4967	5800.2198	5849.0922	8243.8815	9611.3496	10705.0155	10240.8528	9021.5865	6798.3093	5653.3524	5777.6184	88900
Zinc Ortho-phosphate	2.5	2.5	2.5	2.5	5859.9342	5260.4967	5800.2198	5849.0922	8243.8815	9611.3496	10705.0155	10240.8528	9021.5865	6798.3093	5653.3524	5777.6184	88900
Tetra potassium pyrophosphate	0.65	0.65	0.65	0.65	1523.582892	1367.72914	1508.05715	1520.76397	2143.40919	2498.9509	2783.30403	2662.62173	2345.61249	1767.56042	1469.87162	1502.18078	23100
50% Caustic Soda final pH adjust	20	20	20	20	46879.4736	42083.9736	46401.7584	46792.7376	65951.052	76890.7968	85640.124	81926.8224	72172.692	54386.4744	45226.8192	46220.9472	710600
25% Caustic Soda (sludge adjust)	70	70	70	70	1314.414024	1179.04248	1301.31355	1314.41402	1847.16655	2157.21106	2401.7532	2296.94942	2021.83951	1524.02158	1266.37896	1296.94673	20000

Chemical Cost

	Unit Cost per quarter					January	February	March	April	May	June	July	August	September	October	November	December	
	qtr. 1	qtr. 2	qtr. 3	qtr. 4	Unit													
Sodium Permanganate					lbs.	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
50% Caustic Soda coag. pH adjust	$ 0.2135	$ 0.2135	$ 0.2135	$ 0.2135	lbs.	$ 5,010	$ 4,500	$ 4,960	$ 5,000	$ 7,050	$ 8,210	$ 13,720	$ 13,120	$ 11,560	$ 5,810	$ 4,830	$ 4,940	$ 88,710
Carbon Dioxide					lbs.	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ferric Chloride	$ 0.2950	$ 0.2950	$ 0.2950	$ 0.2950	lbs.	$ 24,210	$ 21,730	$ 23,960	$ 24,160	$ 34,050	$ 39,700	$ 50,530	$ 48,340	$ 42,590	$ 28,080	$ 23,350	$ 23,870	$ 384,570
Polymer	$ 1.82	$ 1.82	$ 1.82	$ 1.82	lbs.	$ 1,280	$ 1,150	$ 1,270	$ 1,280	$ 1,810	$ 2,100	$ 2,340	$ 2,240	$ 1,980	$ 1,490	$ 1,240	$ 1,270	$ 19,450
Sodium Hypochlorite	$ 0.6400	$ 0.6400	$ 0.6400	$ 0.6400	lbs.	$ 3,760	$ 3,370	$ 3,720	$ 3,750	$ 5,280	$ 6,160	$ 6,860	$ 6,560	$ 5,780	$ 4,360	$ 3,620	$ 3,700	$ 56,920
Zinc Ortho-phosphate	$ 0.590	$ 0.590	$ 0.590	$ 0.590	lbs.	$ 3,460	$ 3,110	$ 3,430	$ 3,460	$ 4,870	$ 5,680	$ 6,320	$ 6,050	$ 5,330	$ 4,020	$ 3,340	$ 3,410	$ 52,480
TKPP	$ 1.20	$ 1.20	$ 1.20	$ 1.20	lbs.	$ 1,830	$ 1,650	$ 1,810	$ 1,830	$ 2,580	$ 3,000	$ 3,340	$ 3,200	$ 2,820	$ 2,130	$ 1,770	$ 1,810	$ 27,770
50% Caustic Soda final pH adjust	$ 0.2840	$ 0.2840	$ 0.2840	$ 0.2840	lbs.	$ 13,320	$ 11,960	$ 13,180	$ 13,290	$ 18,740	$ 21,840	$ 24,330	$ 23,270	$ 20,500	$ 15,450	$ 12,850	$ 13,130	$ 201,860
25% Caustic Soda	$ 0.4490	$ 0.4490	$ 0.4490	$ 0.4490	lbs.	$ 600	$ 530	$ 590	$ 600	$ 830	$ 970	$ 1,080	$ 1,040	$ 910	$ 690	$ 570	$ 590	$ 9,000
						$ 53,470	$ 48,000	$ 52,920	$ 53,370	$ 75,210	$ 87,660	$ 108,520	$ 103,820	$ 91,470	$ 62,030	$ 51,570	$ 52,720	$ 840,760

Sludge produced in CCF

	Sludge produced gallons/MG					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
WTP Sludge disposal	qtr.1	qtr.2	qtr.3	qtr.4														
Sludge gallons/mg of raw water flow	8000	8000	8000	8000	CCF	3010	2700	2980	3010	4230	4940	5500	5260	4630	3490	2900	2970	45620
Unit cost/CCF	0 9.07	9.07	9.07	9.07	mnthly. $	$ 27,310	$ 24,490	$ 27,030	$ 27,310	$ 38,370	$ 44,810	$ 49,890	$ 47,710	$ 42,000	$ 31,660	$ 26,310	$ 26,940	$ 413,830
Million lbs/month						18.7773432	16.843464	18.5901936	18.7773432	26.3880936	30.8173008	34.31076	32.8135632	28.8834216	21.7717368	18.091128	18.5278104	
																		$ -
					Chemical costs/MG produced (2021) -	$ 287	$ 287	$ 287	$ 288	$ 287	$ 287	$ 309	$ 309	$ 308	$ 287	$ 287	$ 287	$ 293
					Chemical costs/MG produced (2022)[1] -	$ 374	$ 374	$ 374	$ 374	$ 373	$ 374	$ 401	$ 401	$ 401	$ 374	$ 373	$ 374	$ 380

Liquid Chemical Conversion Lbs to Gallons

Specific Gravity of Liquid Chemicals	solution Strength	Specific Gravity	wet Lbs/gallon	2021 Dry lbs/gallon	$/gallon	Gallons/month jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec		
Sodium Permanganate	40%	1.375	11.4675	4.587		0	0	0	0	0	0	0	0	0	0	0	0	0	0
50% Caustic Soda	50%	1.55	12.927	6.72	$ 1.43	10470	9400	10360	10450	14730	17170	22310	21340	18800	12150	10100	10320	167600	13966.67
Ferric Chloride	39%	1.4	11.676	4.55364	$ 1.34	18020	16180	17840	17990	25350	29550	37620	35990	31700	20910	17390	17770	286310	23859.17
Sodium Hypochlorite	13%	1.2	10.008	1.251	$ 0.80	4690	4210	4640	4680	6590	7690	8560	8190	7220	5440	4520	4620	71050	5920.833
Zinc Orthophosphate	100%	1.55	12.927	12.927	$ 7.63	460	410	450	460	640	750	830	800	700	530	440	450	6920	576.6667
25% Caustic	25%	1.27	10.5918	2.752474	$ 1.24	480	430	480	480	680	790	880	840	740	560	470	480	7310	609.1667

1. 2022 Chemicals Expenses expected to increase by 30.0%

Pennichuck Water Works, Inc.
DW 21-134

Petition For Emergency Temporary Rates
Responses to DOE Data Requests – Set 2

Date Request Received: 10/28/21 Date of Response: 10/29/21
Request No. DOE 2-2 Witness: Donald L. Ware

REQUEST: **Re: Ware Testimony: Bates Page 21, Lines 3-5, and Bates Page 28 (Attachment DLW-1), Line 22**: Mr. Ware's testimony (Page 21, Lines 3-5) indicates the "electric distribution cost of each KWH" is projected to increase by 10% in 2022. However, the spreadsheet label (Page 28, Line 22) indicates that the "Transmission Demand charge" is projected to increase by 10% and the actual calculations contained on Line 22 appear to indicate a 10% increase for all charges except the above-mentioned Energy Supply charge. Please provide a detailed explanation for this apparent inconsistency between Page 21 of Mr. Ware's testimony and Attachment DLW-1 (Page 28).

RESPONSE:

The inconsistency occurred to the quick turnaround in preparing the testimony and referenced attachment. The 10% increase in 2022 costs is being applied to all Distribution Demand charges (Rows 14 through 22 on the Electric tab of Attachment DOE 2-1). At this time PWW does not know what Eversource is proposing for changes to its various distribution demand charges and to which charges any increased pricing will apply. As noted in the response to DOE 2-1 above we projected increased pricing to these charges to be conservative in developing a proposed emergency rate knowing that this rate would be trued up to actual costs at the termination of the emergency rate. We used 10% as a place holder based on discussions with PWW's Eversource Account manager who told us to use a 10% across the board increase to all Distribution demand charges to be conservative in our estimated rates.

Pennichuck Water Works, Inc.
DW 21-134

Petition For Emergency Temporary Rates
Responses to DOE Data Requests – Set 2

Date Request Received: 10/28/21 Date of Response: 10/29/21
Request No. DOE 2-3 Witness: Donald L. Ware

REQUEST: **Re: Ware Testimony: Bates Page 28 (Attachment DLW-1), Line 14**: The label on Line 14 (KWH Stranded Cost Recovery Charge) appears to indicate that this item may, in fact, be a credit. However, the actual treatment of this item on Line 14 is that of a cost just like all of the other charges indicated on Page 28. Please provide a detailed explanation for this item and its apparent treatment as a charge rather than as a credit.

RESPONSE:

This part of the spreadsheet was prepared by the Company's Water Supply Manager and is based on PWW's Water Treatment Plant electric bill. The row titles and amounts were taken directly from each bill. I pulled several of the WTP bills and the term used on the bill was "KWH Stranded Cost Recovery Charge" There was no "credit" in the title on that line of the bill. This title was apparently not copied over properly from the bill. That line was clearly a charge on that bill, not a credit.

Pennichuck Water Works, Inc.
DW 21-134

Petition For Emergency Temporary Rates
Responses to DOE Data Requests – Set 2

Date Request Received: 10/28/21 Date of Response: 10/29/21
Request No. DOE 2-4 Witness: Donald L. Ware

REQUEST: **Re: Ware Testimony: Bates Pages 27-29 (Attachment DLW-1)**: There appear to be a number of references (Ex. Chemical spreadsheet Page 29, Line 35 and Summary spreadsheet Page 27, Lines 12, 30, 34) to "100 CCF". Should not these references be simply "CCF", including the final result on Page 27, Line 34 of $0.67 per, similar to that which appears to be presented accurately (as $0.67 per CCF) throughout both the petition and testimony? Please provide a detailed explanation.

RESPONSE:

All references should be to CCF. Any reference to 100 CCF has been corrected to CCF on Attachment DOE 2-1.

Pennichuck Water Works, Inc.
DW 21-134

Petition For Emergency Temporary Rates
Responses to DOE Data Requests – Set 2

Date Request Received: 10/28/21 Date of Response: 10/29/21
Request No. DOE 2-5 Witness: Donald L. Ware

REQUEST: **Re: Petition, Bates Page 7 at 11**: When does the Company anticipate receiving the letters of support from MVD and NHDES and filing them with the Commission?

RESPONSE: The letter of support from the NHDES was filed on October 29, 2021. The letter of support from MVD is forthcoming.