Thomas R. Teehan
Senior Counsel

April 26, 2013

VIA HAND DELIVERY & ELECTRONIC MAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

RE: Docket 4380 - National Grid's Proposed FY 2014 Gas Infrastructure, Safety, and Reliability Plan
Response to Record Request

Dear Ms. Massaro:

On behalf of National Grid[1], I have enclosed ten (10) copies of the Company's response to a Record Request issued by the Commission at its Evidentiary Hearing held on March 21, 2013 concerning the above-referenced proceeding.

Thank you for your attention to this transmittal. If you have any questions, please feel free to contact me at (401) 784-7667.

Very truly yours,

Thomas R. Teehan

Enclosures

cc: Docket 4380 Service List
Leo Wold, Esq.
Steve Scialabba, Division

[1] The Narragansett Electric Company d/b/a National Grid (hereinafter referred to as "National Grid" or the "Company").

Record Request 1

Request:

Please provide the number of miles and rate impact for the Gas ISR if the Company modified its existing 26 year proactive main replacement program to complete in

(a) 20 years
(b) 15 years
(c) 10 years

In addition, for each scenario above, please indicate if it would be possible for the Company to complete the number of miles, and if not, please explain; and

Please provide the number of miles and rate impact by year for the Gas ISR proactive main replacement program.

Response:

Currently, the Company estimates that there are 1,393 miles of leak prone pipe ("LPP") remaining in its Rhode Island gas distribution system. Leak prone pipe is defined as non-cathodically protected ("unprotected") steel, cast iron and wrought iron pipe. The Company has been increasing the amount of LPP replaced each year since FY 2010. The chart below provides the number of miles of main abandoned by National Grid from FY 2010 through FY 2013 under the Company's proactive main replacement program.

	FY10	**FY11**	**FY12**	**FY13**[1]
Leak Prone Main Abandoned	**31**	**38.6**	**45.9**	**50**
Actual Spend ($M)	**$18.7**	**$23.8**	**$26**	**$33.4**

The Company's FY 2014 Gas ISR filing assumes replacement of 53 miles of leak prone pipe (50 miles of proactive main replacement and 3 miles in connection with Public Works projects), an annual rate that if maintained would eliminate the current inventory of LPP in just over 26 years. This is consistent with the approximate 25-year replacement period referred to at the March 21, 2013 Evidentiary Hearing.

[1] *Represents planned mileage and spend as the actual miles of main abandoned and associated spend during FY 2013 are not yet available*

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Attachment RR-1 provides the Company's high-level estimate of the number of miles of main that would need to be abandoned annually along with the associated revenue requirement and an estimate of annual total bill impacts of abandoning that remaining inventory of leak prone main in 20 years, 15 years, and 10 years, as requested. It is important to note that these estimates reflect a reasonable depiction of costs as we know them today but should not be relied on to set expectations of actual future costs or customers' bills, which may ultimately be affected by a variety of factors which have not been considered at this time, such as future variations in gas prices.

Underlying each of these three scenarios are the following factors and assumptions:

- To provide sufficient time to hire and train an appropriate incremental level of personnel, plan out and design the additional work, and obtain the necessary permits, each scenario includes a ramp-up period (generally three years) after which the pipe replacement schedule reaches a plateau for a number of years and then begins to decline as the schedule reaches completion. The assumptions also recognize that, over the life of each scenario, personnel performing work for the program may change through attrition and that the Company would need to replace retiring employees and train new personnel over that time period in order to maintain the accelerated pace of pipe replacement. Furthermore, the assumptions also take into account that the Company's workforce is responsible for supporting a variety of additional programs and projects included in the ISR, such as the gas expansion pilot program, the gas regulator station replacement program, and the gas reliability and reinforcement program, along with the Company's growth program which is not included as part of the ISR.

- The proactive main replacement program has been implemented to replace high-risk facilities each year. In general, the cost to replace cast iron is greater than the cost to replace unprotected steel. The Company anticipates increasing the percentage of cast iron replaced in future years. Therefore, starting in FY 2015, the annual cost of the proactive main replacement program has been updated to reflect this strategy, including an annual adjustment for inflation of two percent per year after FY 2015. In addition, the Company will incur incremental Operations and Maintenance ("O&M") costs associated with the hiring and training of Company personnel as well as costs associated with work performed by such incremental personnel outside of construction season. The Company estimates that for each incremental mile of main above the 50 miles included in the current plan, it will incur incremental O&M costs of approximately $20,000 per mile. Please note that these incremental O&M costs are associated only with personnel who would complete the physical field work, and additional O&M costs may be

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> incurred for additional supervision and for other office-based workers that provide support services. The Company's estimated revenue requirement calculations generated for this response for the 20, 15, and 10-year accelerated replacement scenarios assume recovery of incremental O&M through the ISR since the additional costs of significant increases in personnel are not reflected in base rates.

Attachment RR-1 provides the estimated incremental revenue requirement and rate impacts if the Company were to accelerate LPP replacement over a 20, 15, or 10-year period as compared to a replacement program at the current replacement level of 53 miles over a period of 26.3 years. Several high-level assumptions were used in developing these calculations; however, a more comprehensive analysis would be required to improve the precision of the assumptions and estimates if the parties were interested in pursuing a more aggressive replacement program. Such an analysis may also include variations on the timing of the replacement of LPP in particular years of the program, variations on the types of resources that would be needed to accomplish the program, and a more detailed review of the multitude of factors, including current gas cost forecasts, resource availability, and community impact, that would be encompassed in further acceleration of LPP replacement. Furthermore, such a program would need to be balanced with all of the other important work that will be required by the Company, which may also affect the assumptions and estimates that were used in developing the high-level estimated revenue requirement and rate impacts as shown on Attachment RR-1.

The revenue requirement and rate impacts provided in Attachment RR-1 are for the Proactive Main Replacement Program and Public Works investment categories of the Gas ISR program. It does not reflect the costs of any other investment categories (e.g. Reactive Main Replacement, Mandated Programs, and Gas System Reliability). Attachment RR-1 also does not reflect incremental costs that would be incurred for any increase in, or step changes that might be desired to significantly expand, the gas system to provide greater opportunity to take advantage of unprecedented decreases in the cost of natural gas for the citizens and businesses of the state.

Based on the Company's assessment of risk and its current ability to prudently increase its work load over time, National Grid is evaluating a proposal for ramping up the replacement of the remaining inventory of leak prone main in approximately 20 years to be implemented as part of its FY 2016 ISR plan. The first step in this effort would be to increase the current 50-mile proactive plan by three miles in the Company's FY 2015 ISR plan. Based on the Company's review of its ramp up for FY 2015, it will then assess whether the program can be accelerated further to result in a 20-year replacement plan. A 20-year replacement plan would require the Company to accelerate

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the current 50-mile proactive plan by 20 miles in the early years and then remain at 70 miles for 11 years, before winding down.

With regard to accelerating the program at a more rapid pace, while the Company is open to evaluating its opportunities to accelerate its replacement program each year, either as part of the ISR process or as an isolated accelerated pipe replacement program, the Company believes that achievement of a 15-year replacement program would be extremely difficult and believes that it is highly unlikely, if not impossible, for the LPP replacement program to be completed within 10 years. To achieve a replacement of all LPP within 15 years, many significant changes would have to occur. The Company believes that this level of acceleration would significantly impact the communities the Company serves, and that the Company may have difficulty securing all the necessary permits in each municipality for this level of work. In addition, since the Company has to balance its entire work portfolio with its leak prone pipe replacement program, the Company believes a 15- or 10-year replacement plan would jeopardize other critical projects and programs such as the gas expansion pilot program, the gas regulator station replacement program, the gas reliability and reinforcement program, and the Company's growth program. A 15- or 10-year program would also require a significant incremental commitment in Company personnel and resources, which would increase costs significantly above the current plan levels. Finally, based on the Company's high level estimates reflected on Attachment RR-1, the annual bill impact of this accelerated program alone may prove to be unacceptable.

If the Company accelerates its current plan to a 15-year plan, it would need to increase the current 50-mile proactive plan by 55 miles in the early years and remain at 105 miles for six years, before winding down.

Based on the schedules outlined in Attachment RR-1, the Company estimates that to replace the remaining inventory of 1,393 miles of leak prone main in 10 years would require a ramp up of the current 50-mile proactive program by 145 miles in the early years and remaining at 195 miles for four years, before winding down. From an operational perspective, the Company has determined that completing the replacement of the remaining inventory of LPP in 10 years is impractical and likely not possible. The short, ramp-up time, the accelerated need for hiring and training, the need for accelerated permitting, and the significant impact and disruption on communities and public ways were all considered by the Company in reaching this conclusion.

As mentioned above, the Company will continue to evaluate a proposal to accelerate its current 26-year LPP replacement plan to 20 years, taking into consideration the important factors of risk reduction of LPP facilities, resource needs, the Company's ability to deliver on other important work

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(e.g. gas expansion, reliability, integrity and growth), community impacts, and overall cost to customers. It is quite clear to the Company (at this time) that increasing the pace of LPP replacement to a 15-year or a 10-year plan would be extremely difficult (if not impossible); however, the Company will continue to evaluate these scenarios as part of the yearly ISR process (or as an isolated accelerated pipe replacement program).

Prepared by or under the supervision of: Walter F. Fromm and William R. Richer

Customer Rate Impacts of Hypothetical 20, 15 and 10-Year Leak Prone Pipe Replacement Programs as Compared to the Company's Current Leak Prone Pipe Replacement Program

			(a)	(b)	(c)	(d)=(b)*(c)	(e)	(f)=(d)÷(e)	(g)=(f) ÷ (1-.0318)	(h)=Average Annual Usage*(g) [1]	(i)=Current Yr (h) - Prior Yr (h)	(j)=(i)/ Average Annual Bill + Prior Yr (h) [2]
			Current 26+ Year Plan		Rate Impact							
Line No.	**Program Yr**	**Fiscal Yr**	**Miles Replaced**	**Total Cumulative Revenue Requirement**	**% Allocation to Residential Heating (Res-H) Class**	**Cumulative Revenue Requirement Allocated to Res-H Customers**	**Forecasted Res-H Usage (therms)**	**Illustrative per therm Factor**	**Illustrative per therm Factor including Uncollectibles at 3.18%**	**Cumulative Average Res-H Bill**	**Annual Billing Increase $**	**Annual Billing Increase %**
1	--	2012	46	$ 3,467,799	61.56%	$ 2,134,777	153,649,080	$ 0.0139	$ 0.0144	$ 12.00	$ 12.00	0.98%
2	--	2013	50	$ 7,638,294	61.56%	$ 4,702,134	164,583,399	$ 0.0286	$ 0.0295	$ 25.00	$ 13.00	1.05%
3	1	2014	53	$ 11,588,829	61.56%	$ 7,134,083	177,958,247	$ 0.0401	$ 0.0414	$ 35.00	$ 10.00	0.80%
4	2	2015	53	$ 15,989,589	61.56%	$ 9,843,191	178,038,389	$ 0.0553	$ 0.0571	$ 48.00	$ 13.00	1.03%
5	3	2016	53	$ 20,396,574	61.56%	$ 12,556,131	178,170,924	$ 0.0705	$ 0.0728	$ 62.00	$ 14.00	1.10%
6	4	2017	53	$ 24,794,809	61.56%	$ 15,263,685	178,355,204	$ 0.0856	$ 0.0884	$ 75.00	$ 13.00	1.01%
7	5	2018	53	$ 29,187,154	61.56%	$ 17,967,612	178,601,835	$ 0.1006	$ 0.1039	$ 88.00	$ 13.00	1.00%
8	6	2019	53	$ 33,576,302	61.56%	$ 20,669,572	178,909,520	$ 0.1155	$ 0.1193	$ 101.00	$ 13.00	0.99%
9	7	2020	53	$ 37,964,697	61.56%	$ 23,371,067	179,270,661	$ 0.1304	$ 0.1347	$ 114.00	$ 13.00	0.98%
10	8	2021	53	$ 42,354,199	61.56%	$ 26,073,245	179,672,230	$ 0.1451	$ 0.1499	$ 127.00	$ 13.00	0.97%
11	9	2022	53	$ 46,746,031	61.56%	$ 28,776,857	180,085,198	$ 0.1598	$ 0.1650	$ 140.00	$ 13.00	0.96%
12	10	2023	53	$ 51,140,794	61.56%	$ 31,482,273	180,487,210	$ 0.1744	$ 0.1801	$ 152.00	$ 12.00	0.88%
13	11	2024	53	$ 55,538,619	61.56%	$ 34,189,574	180,865,674	$ 0.1890	$ 0.1952	$ 165.00	$ 13.00	0.95%
14	12	2025	53	$ 59,939,561	61.56%	$ 36,898,794	181,214,094	$ 0.2036	$ 0.2103	$ 178.00	$ 13.00	0.94%
15	13	2026	53	$ 64,343,690	61.56%	$ 39,609,976	181,527,980	$ 0.2182	$ 0.2254	$ 191.00	$ 13.00	0.93%
16	14	2027	53	$ 68,751,070	61.56%	$ 42,323,159	181,802,457	$ 0.2328	$ 0.2404	$ 203.00	$ 12.00	0.85%
17	15	2028	53	$ 73,161,759	61.56%	$ 45,038,379	182,038,004	$ 0.2474	$ 0.2555	$ 216.00	$ 13.00	0.91%
18	16	2029	53	$ 77,575,831	61.56%	$ 47,755,682	182,233,918	$ 0.2621	$ 0.2707	$ 229.00	$ 13.00	0.90%
19	17	2030	53	$ 81,993,353	61.56%	$ 50,475,108	182,389,630	$ 0.2767	$ 0.2858	$ 242.00	$ 13.00	0.90%
20	18	2031	53	$ 86,414,383	61.56%	$ 53,196,694	182,525,431	$ 0.2914	$ 0.3010	$ 255.00	$ 13.00	0.89%
21	19	2032	53	$ 90,839,739	61.56%	$ 55,920,943	182,647,237	$ 0.3062	$ 0.3163	$ 268.00	$ 13.00	0.88%
22	20	2033	53	$ 95,273,589	61.56%	$ 58,650,421	182,773,430	$ 0.3209	$ 0.3314	$ 280.00	$ 12.00	0.80%
23	21	2034	53	$ 99,723,106	61.56%	$ 61,389,544	182,919,953	$ 0.3356	$ 0.3466	$ 293.00	$ 13.00	0.86%
24	22	2035	53	$ 104,196,000	61.56%	$ 64,143,058	183,091,621	$ 0.3503	$ 0.3618	$ 306.00	$ 13.00	0.86%
25	23	2036	53	$ 108,699,214	61.56%	$ 66,915,236	183,329,640	$ 0.3650	$ 0.3770	$ 319.00	$ 13.00	0.85%
26	24	2037	53	$ 113,236,091	61.56%	$ 69,708,137	183,567,969	$ 0.3797	$ 0.3922	$ 332.00	$ 13.00	0.84%
27	25	2038	53	$ 117,807,299	61.56%	$ 72,522,173	183,806,607	$ 0.3946	$ 0.4076	$ 345.00	$ 13.00	0.84%
28	26	2039	53	$ 122,413,524	61.56%	$ 75,357,765	184,045,556	$ 0.4095	$ 0.4229	$ 358.00	$ 13.00	0.83%
29	27	2040	15	$ 121,723,610	61.56%	$ 74,933,054	184,284,815	$ 0.4066	$ 0.4200	$ 355.00	$ (3.00)	-0.19%
30			1393									
31										26+-year average Res-H increase		**0.87%**

[1] Average Residential Heating Annual Usage (therms) = 846 therms
[2] Average Residential Heating Annual Bill = $1,223

Customer Rate Impacts of Hypothetical 20, 15 and 10-Year Leak Prone Pipe Replacement Programs as Compared to the Company's Current Leak Prone Pipe Replacement Program

			(a)	(b)	(c)	(d)=(b)*(c)	(e)	(f)=(d)÷(e)	(g)=(f) ÷ (1-.0318)	(h)=Average Annual Usage*(g) [1]	(i)=Current Yr (h) - Prior Yr (h)	(j)=(i)/ Average Annual Bill + Prior Yr (h) [2]	Page 2 (i) - Page 1 (i)	Page 2 (j) - Page 1 (j)
			20 Year Plan		Rate Impact								Comparison	
Line No.	**Program Yr**	**Fiscal Yr**	**Miles Replaced**	**Total Cumulative Revenue Requirement**	**% Allocation to Residential Heating (Res-H) Class**	**Cumulative Revenue Requirement Allocated to Res-H Customers**	**Forecasted Res-H Usage (therms)**	**Illustra-tive per therm Factor**	**Illustrative per therm Factor including Uncollectibles at 3.18%**	**Cumulative Average Res-H Bill**	**Annual Billing Increase $**	**Annual Billing Increase %**	**Average Annual Res-H $ Increase: 20-Yr vs. Current Plan**	**Average Annual Res-H % Increase: 20-Yr vs. Current Plan**
1	--	2012	46	$ 3,467,799	61.56%	$ 2,134,777	153,649,080	$ 0.0139	$ 0.0144	$ 12.00	$ 12.00	0.98%	$ -	0.00%
2	--	2013	50	$ 7,638,294	61.56%	$ 4,702,134	164,583,399	$ 0.0286	$ 0.0295	$ 25.00	$ 13.00	1.05%	$ -	0.00%
3	1	2014	53	$ 11,588,829	61.56%	$ 7,134,083	177,958,247	$ 0.0401	$ 0.0414	$ 35.00	$ 10.00	0.80%	$ -	0.00%
4	2	2015	61	$ 17,130,315	61.56%	$ 10,545,422	178,038,389	$ 0.0592	$ 0.0611	$ 52.00	$ 17.00	1.35%	$ 4.00	0.32%
5	3	2016	68	$ 23,330,661	61.56%	$ 14,362,355	178,170,924	$ 0.0806	$ 0.0832	$ 70.00	$ 18.00	1.41%	$ 4.00	0.31%
6	4	2017	78	$ 30,207,502	61.56%	$ 18,595,738	178,355,204	$ 0.1043	$ 0.1077	$ 91.00	$ 21.00	1.62%	$ 8.00	0.61%
7	5	2018	78	$ 37,093,338	61.56%	$ 22,834,659	178,601,835	$ 0.1279	$ 0.1321	$ 112.00	$ 21.00	1.60%	$ 8.00	0.60%
8	6	2019	78	$ 43,970,816	61.56%	$ 27,068,434	178,909,520	$ 0.1513	$ 0.1563	$ 132.00	$ 20.00	1.50%	$ 7.00	0.51%
9	7	2020	78	$ 50,843,979	61.56%	$ 31,299,554	179,270,661	$ 0.1746	$ 0.1803	$ 153.00	$ 21.00	1.55%	$ 8.00	0.57%
10	8	2021	78	$ 57,716,196	61.56%	$ 35,530,090	179,672,230	$ 0.1977	$ 0.2042	$ 173.00	$ 20.00	1.45%	$ 7.00	0.48%
11	9	2022	78	$ 64,590,114	61.56%	$ 39,761,674	180,085,198	$ 0.2208	$ 0.2281	$ 193.00	$ 20.00	1.43%	$ 7.00	0.47%
12	10	2023	78	$ 71,467,488	61.56%	$ 43,995,385	180,487,210	$ 0.2438	$ 0.2518	$ 213.00	$ 20.00	1.41%	$ 8.00	0.53%
13	11	2024	78	$ 78,349,197	61.56%	$ 48,231,766	180,865,674	$ 0.2667	$ 0.2755	$ 233.00	$ 20.00	1.39%	$ 7.00	0.44%
14	12	2025	78	$ 85,235,642	61.56%	$ 52,471,061	181,214,094	$ 0.2896	$ 0.2991	$ 253.00	$ 20.00	1.37%	$ 7.00	0.43%
15	13	2026	78	$ 92,126,959	61.56%	$ 56,713,356	181,527,980	$ 0.3124	$ 0.3227	$ 273.00	$ 20.00	1.36%	$ 7.00	0.43%
16	14	2027	78	$ 99,023,248	61.56%	$ 60,958,712	181,802,457	$ 0.3353	$ 0.3463	$ 293.00	$ 20.00	1.34%	$ 8.00	0.49%
17	15	2028	76	$ 105,694,575	61.56%	$ 65,065,580	182,038,004	$ 0.3574	$ 0.3691	$ 312.00	$ 19.00	1.25%	$ 6.00	0.34%
18	16	2029	76	$ 112,366,472	61.56%	$ 69,172,800	182,233,918	$ 0.3796	$ 0.3921	$ 332.00	$ 20.00	1.30%	$ 7.00	0.40%
19	17	2030	75	$ 118,924,620	61.56%	$ 73,209,996	182,389,630	$ 0.4014	$ 0.4146	$ 351.00	$ 19.00	1.22%	$ 6.00	0.32%
20	18	2031	72	$ 125,120,068	61.56%	$ 77,023,914	182,525,431	$ 0.4220	$ 0.4359	$ 369.00	$ 18.00	1.14%	$ 5.00	0.25%
21	19	2032	37	$ 126,137,723	61.56%	$ 77,650,382	182,647,237	$ 0.4251	$ 0.4391	$ 371.00	$ 2.00	0.13%	$ (11.00)	-0.75%
22	20	2033	17	$ 124,960,400	61.56%	$ 76,925,622	182,773,430	$ 0.4209	$ 0.4347	$ 368.00	$ (3.00)	-0.19%	$ (15.00)	-0.99%
23	21	2034	0	$ 120,522,319	61.56%	$ 74,193,539	182,919,953	$ 0.4056	$ 0.4189	$ 354.00	$ (14.00)	-0.88%	$ (27.00)	-1.74%
24	22	2035	0	$ 117,572,480	61.56%	$ 72,377,619	183,091,621	$ 0.3953	$ 0.4083	$ 345.00	$ (9.00)	-0.57%	$ (22.00)	-1.43%
25	23	2036	0	$ 114,676,558	61.56%	$ 70,594,889	183,329,640	$ 0.3851	$ 0.3977	$ 336.00	$ (9.00)	-0.57%	$ (22.00)	-1.42%
26	24	2037	0	$ 111,836,958	61.56%	$ 68,846,832	183,567,969	$ 0.3750	$ 0.3873	$ 328.00	$ (8.00)	-0.51%	$ (21.00)	-1.35%
27	25	2038	0	$ 109,052,954	61.56%	$ 67,132,999	183,806,607	$ 0.3652	$ 0.3772	$ 319.00	$ (9.00)	-0.58%	$ (22.00)	-1.42%
28	26	2039	0	$ 106,321,843	61.56%	$ 65,451,726	184,045,556	$ 0.3556	$ 0.3673	$ 311.00	$ (8.00)	-0.52%	$ (21.00)	-1.35%
29	27	2040	0	$ 103,640,751	61.56%	$ 63,801,247	184,284,815	$ 0.3462	$ 0.3576	$ 303.00	$ (8.00)	-0.52%	$ (5.00)	-0.33%
30			1393											
31											20-year average Res-H increase	**1.22%**		

[1] Average Residential Heating Annual Usage (therms) = 846 therms

[2] Average Residential Heating Annual Bill = $1,223

Customer Rate Impacts of Hypothetical 20, 15 and 10-Year Leak Prone Pipe Replacement Programs as Compared to the Company's Current Leak Prone Pipe Replacement Program

			(a)	(b)										(h)=Average Annual Usage*(g) [1]	(i)=Current Yr (h) - Prior Yr (h)	(j)=(i)/ Average Annual Bill + Prior Yr (h) [2]		
			15 Year Plan														Page 3 (i) - Page 1 (i)	Page 3 (j) - Page 1 (j)
								Rate Impact									Comparison	
Line No.	**Program Yr**	**Fiscal Yr**	**Miles Replaced**	**Total Cumulative Revenue Requirement**	**% Allocation to Residential Heating (Res-H) Class**	**Cumulative Revenue Requirement Allocated to Res-H Customers**	**Forecasted Res-H Usage (therms)**	**Illustrative per therm Factor**	**Illustrative per therm Factor including Uncollectibles at 3.18%**	**Cumulative Average Res-H Bill**	**Annual Billing Increase $**	**Annual Billing Increase %**	**Average Annual Res-H $ Increase: 15-Yr vs. Current Plan**	**Average Annual Res-H % Increase: 15-Yr vs. Current Plan**				
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3	1	2014	53	$ 11,588,829	61.56%	$ 7,134,083	177,958,247	$ 0.0401	$ 0.0414	$ 35.00	$ 10.00	0.80%	$ -	0.00%				
4	2	2015	63	$ 17,841,786	61.56%	$ 10,983,404	178,038,389	$ 0.0617	$ 0.0637	$ 54.00	$ 19.00	1.51%	$ 6.00	0.48%				
5	3	2016	88	$ 28,369,484	61.56%	$ 17,464,254	178,170,924	$ 0.0980	$ 0.1012	$ 86.00	$ 32.00	2.51%	$ 18.00	1.41%				
6	4	2017	113	$ 40,822,894	61.56%	$ 25,130,574	178,355,204	$ 0.1409	$ 0.1455	$ 123.00	$ 37.00	2.83%	$ 24.00	1.82%				
7	5	2018	113	$ 51,058,845	61.56%	$ 31,431,825	178,601,835	$ 0.1760	$ 0.1818	$ 154.00	$ 31.00	2.30%	$ 18.00	1.30%				
8	6	2019	113	$ 61,280,807	61.56%	$ 37,724,465	178,909,520	$ 0.2109	$ 0.2178	$ 184.00	$ 30.00	2.18%	$ 17.00	1.19%				
9	7	2020	113	$ 71,495,005	61.56%	$ 44,012,325	179,270,661	$ 0.2455	$ 0.2536	$ 215.00	$ 31.00	2.20%	$ 18.00	1.22%				
10	8	2021	113	$ 81,706,852	61.56%	$ 50,298,738	179,672,230	$ 0.2799	$ 0.2891	$ 245.00	$ 30.00	2.09%	$ 17.00	1.12%				
11	9	2022	113	$ 91,920,922	61.56%	$ 56,586,519	180,085,198	$ 0.3142	$ 0.3245	$ 275.00	$ 30.00	2.04%	$ 17.00	1.08%				
12	10	2023	112	$ 101,840,255	61.56%	$ 62,692,861	180,487,210	$ 0.3474	$ 0.3588	$ 304.00	$ 29.00	1.94%	$ 17.00	1.06%				
13	11	2024	110	$ 111,353,033	61.56%	$ 68,548,927	180,865,674	$ 0.3790	$ 0.3914	$ 331.00	$ 27.00	1.77%	$ 14.00	0.82%				
14	12	2025	110	$ 121,255,183	61.56%	$ 74,644,691	181,214,094	$ 0.4119	$ 0.4254	$ 360.00	$ 29.00	1.87%	$ 16.00	0.93%				
15	13	2026	107	$ 130,244,463	61.56%	$ 80,178,491	181,527,980	$ 0.4417	$ 0.4562	$ 386.00	$ 26.00	1.64%	$ 13.00	0.71%				
16	14	2027	49	$ 125,455,911	61.56%	$ 77,230,659	181,802,457	$ 0.4248	$ 0.4388	$ 371.00	$ (15.00)	-0.93%	$ (27.00)	-1.78%				
17	15	2028	23	$ 124,976,406	61.56%	$ 76,935,475	182,038,004	$ 0.4226	$ 0.4365	$ 369.00	$ (2.00)	-0.13%	$ (15.00)	-1.04%				
18	16	2029	0	$ 124,520,684	61.56%	$ 76,654,933	182,233,918	$ 0.4206	$ 0.4344	$ 368.00	$ (1.00)	-0.06%	$ (14.00)	-0.96%				
19	17	2030	0	$ 121,596,265	61.56%	$ 74,854,661	182,389,630	$ 0.4104	$ 0.4239	$ 359.00	$ (9.00)	-0.57%	$ (22.00)	-1.47%				
20	18	2031	0	$ 118,702,844	61.56%	$ 73,073,471	182,525,431	$ 0.4003	$ 0.4134	$ 350.00	$ (9.00)	-0.57%	$ (22.00)	-1.46%				
21	19	2032	0	$ 115,833,211	61.56%	$ 71,306,925	182,647,237	$ 0.3904	$ 0.4032	$ 341.00	$ (9.00)	-0.57%	$ (22.00)	-1.45%				
22	20	2033	0	$ 112,984,059	61.56%	$ 69,552,987	182,773,430	$ 0.3805	$ 0.3930	$ 332.00	$ (9.00)	-0.58%	$ (21.00)	-1.38%				
23	21	2034	0	$ 110,155,602	61.56%	$ 67,811,789	182,919,953	$ 0.3707	$ 0.3829	$ 324.00	$ (8.00)	-0.51%	$ (21.00)	-1.37%				
24	22	2035	0	$ 107,352,096	61.56%	$ 66,085,950	183,091,621	$ 0.3609	$ 0.3728	$ 315.00	$ (9.00)	-0.58%	$ (22.00)	-1.44%				
25	23	2036	0	$ 104,584,908	61.56%	$ 64,382,469	183,329,640	$ 0.3512	$ 0.3627	$ 307.00	$ (8.00)	-0.52%	$ (21.00)	-1.37%				
26	24	2037	0	$ 101,869,243	61.56%	$ 62,710,706	183,567,969	$ 0.3416	$ 0.3528	$ 298.00	$ (9.00)	-0.59%	$ (22.00)	-1.43%				
27	25	2038	0	$ 99,217,084	61.56%	$ 61,078,037	183,806,607	$ 0.3323	$ 0.3432	$ 290.00	$ (8.00)	-0.53%	$ (21.00)	-1.37%				
28	26	2039	0	$ 96,633,410	61.56%	$ 59,487,527	184,045,556	$ 0.3232	$ 0.3338	$ 282.00	$ (8.00)	-0.53%	$ (21.00)	-1.36%				
29	27	2040	0	$ 94,119,596	61.56%	$ 57,940,023	184,284,815	$ 0.3144	$ 0.3247	$ 275.00	$ (7.00)	-0.47%	$ (4.00)	-0.28%				
30			1393															
31												15-year average Res-H increase	**1.64%**					

[1] Average Residential Heating Annual Usage (therms) = 846 therms

[2] Average Residential Heating Annual Bill = $1,223

Customer Rate Impacts of Hypothetical 20, 15 and 10-Year Leak Prone Pipe Replacement Programs as Compared to the Company's Current Leak Prone Pipe Replacement Program

			(a)	(b)	(c)	(d)=(b)*(c)	(e)	(f)=(d)÷(e)	(g)=(f) ÷ (1-.0318)	(h)=Average Annual Usage*(g) [1]	(i)=Current Yr (h) - Prior Yr (h)	(j)=(i)/ Average Annual Bill + Prior Yr (h) [2]	Page 4 (i) - Page 1 (i)	Page 4 (j) - Page 1 (j)
			10 Year Plan		Rate Impact								Comparison	
Line No.	**Program Yr**	**Fiscal Yr**	**Miles Replaced**	**Total Cumulative Revenue Requirement**	**% Allocation to Residential Heating (Res-H) Class**	**Cumulative Revenue Requirement Allocated to Res-H Customers**	**Forecasted Res-H Usage (therms)**	**Illustra-tive per therm Factor**	**Illustrative per therm Factor including Uncollectibles at 3.18%**	**Cumulative Average Res-H Bill**	**Annual Billing Increase $**	**Annual Billing Increase %**	**Average Annual Res-H $ Increase: 10-Yr vs. Current Plan**	**Average Annual Res-H % Increase: 10-Yr vs. Current Plan**
1	--	2012	46	$ 3,467,799	61.56%	$ 2,134,777	153,649,080	$ 0.0139	$ 0.0144	$ 12.00	$ 12.00	0.98%	$ -	0.00%
2	--	2013	50	$ 7,638,294	61.56%	$ 4,702,134	164,583,399	$ 0.0286	$ 0.0295	$ 25.00	$ 13.00	1.05%	$ -	0.00%
3	1	2014	53	$ 11,588,829	61.56%	$ 7,134,083	177,958,247	$ 0.0401	$ 0.0414	$ 35.00	$ 10.00	0.80%	$ -	0.00%
4	2	2015	88	$ 23,885,699	61.56%	$ 14,704,036	178,038,389	$ 0.0826	$ 0.0853	$ 72.00	$ 37.00	2.94%	$ 24.00	1.91%
5	3	2016	128	$ 38,948,974	61.56%	$ 23,976,988	178,170,924	$ 0.1346	$ 0.1390	$ 118.00	$ 46.00	3.55%	$ 32.00	2.45%
6	4	2017	203	$ 67,012,443	61.56%	$ 41,252,860	178,355,204	$ 0.2313	$ 0.2389	$ 202.00	$ 84.00	6.26%	$ 71.00	5.25%
7	5	2018	203	$ 85,811,493	61.56%	$ 52,825,555	178,601,835	$ 0.2958	$ 0.3055	$ 258.00	$ 56.00	3.93%	$ 43.00	2.93%
8	6	2019	203	$ 104,581,817	61.56%	$ 64,380,566	178,909,520	$ 0.3598	$ 0.3716	$ 314.00	$ 56.00	3.78%	$ 43.00	2.79%
9	7	2020	203	$ 123,335,174	61.56%	$ 75,925,133	179,270,661	$ 0.4235	$ 0.4374	$ 370.00	$ 56.00	3.64%	$ 43.00	2.66%
10	8	2021	200	$ 141,010,930	61.56%	$ 86,806,329	179,672,230	$ 0.4831	$ 0.4990	$ 422.00	$ 52.00	3.26%	$ 39.00	2.29%
11	9	2022	79	$ 126,447,756	61.56%	$ 77,841,238	180,085,198	$ 0.4322	$ 0.4464	$ 378.00	$ (44.00)	-2.67%	$ (57.00)	-3.63%
12	10	2023	33	$ 126,259,038	61.56%	$ 77,725,064	180,487,210	$ 0.4306	$ 0.4447	$ 376.00	$ (2.00)	-0.12%	$ (14.00)	-1.00%
13	11	2024	0	$ 126,254,602	61.56%	$ 77,722,333	180,865,674	$ 0.4297	$ 0.4438	$ 375.00	$ (1.00)	-0.06%	$ (14.00)	-1.01%
14	12	2025	0	$ 123,406,821	61.56%	$ 75,969,239	181,214,094	$ 0.4192	$ 0.4330	$ 366.00	$ (9.00)	-0.56%	$ (22.00)	-1.50%
15	13	2026	0	$ 120,609,340	61.56%	$ 74,247,109	181,527,980	$ 0.4090	$ 0.4224	$ 357.00	$ (9.00)	-0.57%	$ (22.00)	-1.50%
16	14	2027	0	$ 117,849,094	61.56%	$ 72,547,902	181,802,457	$ 0.3990	$ 0.4121	$ 349.00	$ (8.00)	-0.51%	$ (20.00)	-1.36%
17	15	2028	0	$ 115,113,811	61.56%	$ 70,864,062	182,038,004	$ 0.3893	$ 0.4021	$ 340.00	$ (9.00)	-0.57%	$ (22.00)	-1.48%
18	16	2029	0	$ 112,392,020	61.56%	$ 69,188,527	182,233,918	$ 0.3797	$ 0.3922	$ 332.00	$ (8.00)	-0.51%	$ (21.00)	-1.41%
19	17	2030	0	$ 109,675,467	61.56%	$ 67,516,217	182,389,630	$ 0.3702	$ 0.3824	$ 324.00	$ (8.00)	-0.51%	$ (21.00)	-1.41%
20	18	2031	0	$ 106,960,326	61.56%	$ 65,844,777	182,525,431	$ 0.3607	$ 0.3725	$ 315.00	$ (9.00)	-0.58%	$ (22.00)	-1.47%
21	19	2032	0	$ 104,246,068	61.56%	$ 64,173,879	182,647,237	$ 0.3514	$ 0.3629	$ 307.00	$ (8.00)	-0.52%	$ (21.00)	-1.40%
22	20	2033	0	$ 101,536,650	61.56%	$ 62,505,962	182,773,430	$ 0.3420	$ 0.3532	$ 299.00	$ (8.00)	-0.52%	$ (20.00)	-1.32%
23	21	2034	0	$ 98,839,168	61.56%	$ 60,845,392	182,919,953	$ 0.3326	$ 0.3435	$ 291.00	$ (8.00)	-0.53%	$ (21.00)	-1.39%
24	22	2035	0	$ 96,166,538	61.56%	$ 59,200,121	183,091,621	$ 0.3233	$ 0.3339	$ 282.00	$ (9.00)	-0.59%	$ (22.00)	-1.45%
25	23	2036	0	$ 93,542,136	61.56%	$ 57,584,539	183,329,640	$ 0.3141	$ 0.3244	$ 274.00	$ (8.00)	-0.53%	$ (21.00)	-1.38%
26	24	2037	0	$ 90,997,733	61.56%	$ 56,018,204	183,567,969	$ 0.3052	$ 0.3152	$ 267.00	$ (7.00)	-0.47%	$ (20.00)	-1.31%
27	25	2038	0	$ 88,563,029	61.56%	$ 54,519,401	183,806,607	$ 0.2966	$ 0.3063	$ 259.00	$ (8.00)	-0.54%	$ (21.00)	-1.38%
28	26	2039	0	$ 86,251,362	61.56%	$ 53,096,338	184,045,556	$ 0.2885	$ 0.2980	$ 252.00	$ (7.00)	-0.47%	$ (20.00)	-1.30%
29	27	2040	0	$ 84,065,188	61.56%	$ 51,750,530	184,284,815	$ 0.2808	$ 0.2900	$ 245.00	$ (7.00)	-0.47%	$ (4.00)	-0.28%
30			1393											
31											10-year average Res-H increase	**2.54%**		

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