Raquel J. Webster
Senior Counsel

March 22, 2022

BY ELECTRONIC MAIL

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

RE: Docket 5210 - Proposed FY 2023 Gas Infrastructure, Safety and Reliability Plan
Responses to Record Requests (Complete Set)

Dear Ms. Massaro:

I have enclosed the electronic version of National Grid's[1] complete set of responses to the record requests that were issued at the Public Utilities Commission's evidentiary hearing in the above-referenced matter.[2]

In addition to the responses submitted yesterday, March 22, 2022, this transmittal includes the following record requests: RR-2, 6, 8, 9, 11, 12, and 16.

Thank you for your attention to this matter. If you have any questions, please contact me at 781-472-0531.

Very truly yours,

Raquel J. Webster

Enclosures

cc: Docket 5210 Service List
Leo Wold, Esq.
Al Mancini, Division
John Bell, Division
Rod Walker, Division

[1] The Narragansett Electric Company d/b/a National Grid.

[2] Per a communication from Commission counsel on October 4, 2021, the Company is submitting an electronic version of this filing followed by six (6) hard copies filed with the Clerk within 24 hours of the electronic filing.

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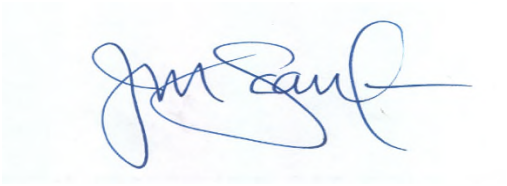
Certificate of Service

I hereby certify that a copy of the cover letter and any materials accompanying this certificate was electronically transmitted to the individuals listed below.

The paper copies of this filing are being hand delivered to the Rhode Island Public Utilities Commission and to the Rhode Island Division of Public Utilities and Carriers.



Joanne M. Scanlon

March 22, 2022
Date

Docket No. 5210 - National Grid's FY 2023 Gas Infrastructure, Safety and Reliability (ISR) Plan - Service List 12/22/2021

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Record Request No. 1

Request:

Will there be continuity with the Synergi software when PPL assumes ownership of The Narragansett Electric Company?

Response:

Yes. PPL has confirmed that there will be continuity with the Synergi software when PPL assumes ownership of The Narragansett Electric Company.

Prepared by or under the supervision of: Amy Smith

Record Request No. 2

Request:

Are there any operating costs in FY 2023 being charged to The Narragansett Electric Company by the service company for GBE, and if so, what are they?

Response:

Based on the latest Gas Business Enablement ("GBE") Program forecast, the projected GBE-related operating costs that will be charged to The Narragansett Electric Company by the service company in FY 2023 is $0.41 million. All GBE costs are tracked separately from the ISR Plan as approved by the Rhode Island Public Utilities Commission in Docket 4770.

Prepared by or under the supervision of: Amy Smith

Record Request No. 3

Request:

Of the replacement projects in FY 2021 where the Company was unable to abandon the old mains, please provide the following information:

a. The number of old mains still in service, if any;
b. The location of each;
c. The length of miles of each;
d. The number of services that are yet to be changed out;
e. The capital cost of each pipeline that was intended to replace the old main; and
f. The estimate of when each of the old mains is forecasted to be abandoned.

Response:

Please see Attachment RR-3.

Attachment RR-3

Of the replacement projects in FY 2021 where the Company was unable to abandon the old mains, please provide the following information:

a. The number of old mains still in service, if any;
b. The location of each;
c. The length of miles of each;
d. The number of services that are yet to be changed out;
e. The capital cost of each pipeline that was intended to replace the old main;
f. The estimate of when each of the old mains is forecasted to be abandoned; and

a	b	c	d	e	f
# Old Mains	Project Location	Miles to be abandoned	Services to be completed	*Capital cost of each pipeline	Estimate when Old Main will be Abandoned
1	Vinton St, PVD, Providence	1.08	55	$622,993	Q3, FY23
2	Union Av, PVD, Providence	0.35	1	$818,953	Q2, FY23
3	Transit St, WSO, Woonsocket	0.32	2	$424,293	Q4, FY22
4	Terrace Av, PVD, Providence	0.56	3	$1,336,420	Q1, FY23
5	Sessions St, PVD, Providence	0.35	14	$448,797	Q2, FY23
6	S Main St PVD, Providence	0.39	0	$1,057,241	Q1, FY23
7	RIDOT Division St Bridge, East Greenwich	0.09	0	$288,970	Q4, FY23
8	Old Park Ave, CRA, Cranston	0.10	0	$385,944	Q1, FY23
9	N Main St PVD, Providence	0.49	1	$1,280,802	Q2, FY23
10	Metcalf St PVD, Providence	1.35	2	$1,741,529	Q2, FY23
11	Lyman Ave, North Providence	0.79	5	$887,247	Q4, FY22
12	Lippit Ave WWK, Warwick	0.04	1	$34,761	Q4, FY23
13	Hope Furnace Rd, Scituate	0.01	0	$68,546	Q3, FY23
14	Heights Ave WWK, Warwick	0.14	10	$123,982	Q4, FY23
15	Friendship St WWK, Warwick	0.08	8	$77,666	Q4, FY23
16	Fairmount St, WSO, Woonsocket	0.55	0	$589,774	Q4, FY22
17	Dover St, PVD, Providence	0.42	15	$479,181	Q3, FY23
18	Dean St, PVD, Providence	0.81	0	$1,796,938	Q3, FY23
19	Commodore St PVD, Providence	1.43	16	$1,816,945	Q3, FY23
20	Althea St, PVD, Providence	0.13	6	$294,317	Q2, FY23
21	1315-1477 Broad St, PVD, Providence	0.44	0	$1,227,835	Q1, FY23
22	1207-1275 Elmwood Av, PVD, Providenc	0.58	0	$1,324,195	Q1, FY23

*Capital cost is pre-construction estimate.

Record Request No. 4

Request:

Of the replacement projects in FY 2022 where the Company was unable to abandon the old mains, please provide the following information:

a. The number of old maims still in service, if any;
b. The location of each;
c. The length of miles of each;
d. The number of services that are yet to be changed out;
e. The capital cost of each pipeline that was intended to replace the old main;
f. The estimate of when each of the old mains is forecasted to be abandoned; and
g. Whether the identified main that was installed next to the old main has been put into rate base or whether the Company is proposing to put the capital cost into rate base with this year's ISR filing.

Response:

Please see Attachment RR-4.

Please note that the amounts provided in response to part e. are pre-construction estimates totaling $40.6 million. Projects reported in the last column with a "Y" designation are currently considered to be in-service with a total of $17 million in actual spend as of February 28, 2022. These costs, along with additional costs incurred in March 2022, would be reconciled for recovery in the FY2022 ISR reconciliation filing.

Attachment RR-4

Of the replacement projects in FY 2022 where the Company was unable to abandon the old mains, please provide the following information:

a. The number of old mains still in service, if any;
b. The location of each;
c. The length of miles of each;
d. The number of services that are yet to be changed out;
e. The capital cost of each pipeline that was intended to replace the old main;
f. The estimate of when each of the old mains is forecasted to be abandoned; and
g. Whether the identified main that was installed next to the old main has been put into rate base or whether the Company is proposing to put the capital cost into rate base with this year's ISR filing.

a	b	c	d	e	f	g
# Old Mains	Project Location	Miles to be abandoned	Services to be completed	Capital cost of each pipeline[1]	Estimate when old main will be abandoned	To be included in FY22 ISR filing[2]
1	Willow Ave, Woonsocket	0.964	91	$963,972	Q4, FY23	N
2	Waterman Ave , North Providence	0.600	21	$521,748	Q3, FY23	Y
3	Waterman Ave , Smithfield	1.152	27	$505,799	Q4, FY24	Y
4	Wannamoisett Rd, East Providence	0.853	72	$969,392	Q2, FY23	N
5	Vineyard Ave, East Providence	0.800	62	$814,482	Q2, FY23	N
6	Taft Ave, Providence	0.215	0	$306,044	Q1, FY23	Y
7	Summit Ave , North Smithfield	0.119	17	$142,098	Q3, FY23	N
8	Spruce St, Westerly	0.774	0	$817,054	Q4, FY22	Y
9	Smithfield Rd, North Smithfield	1.291	56	$924,860	Q4, FY23	N
10	Slade St, Pawtucket	0.283	30	$537,534	Q4, FY23	N
11	Sabin St, Warwick	0.523	44	$726,618	Q2, FY23	N
12	Rt.6/Rt.10 Interchange Reconstruction, Providence	0.129	0	229,971	Q4, FY23	N
13	Rounds Av, PVD, Providence	0.561	1	$1,220,011	Q1, FY23	Y
14	RIDOT Rte 5 Bridge, Warwick	0.105	0	$172,546	Q4, FY23	N
15	RIDOT Park Ave RR Bridge No 922 HP, Cranston	0.057	0	$133,209	Q4, FY23	N
16	RIDOT Park Ave RR Bridge No 922, Cranston	0.077	0	$266,419	Q4, FY23	N
17	Reservoir Ave Bridge, Providence	0.157	6	$378,071	Q4, FY23	Y
18	Reservior Ave Bridge, Providence	0.005	0	333,348	Q4, FY23	N
19	Quaker Dr Area, West Warwick	1.052	13	$841,043	Q4, FY22	Y
20	QDC Mill Creek Railyard, North Kingston	0.523	0	$1,311,205	Q1, FY23	N
21	Powder Hill Rd, Lincoln	0.345	3	$791,252	Q4, FY22	N
22	Pawtucket Ave, East Providence	0.051	2	$173,125	Q3, FY23	N
23	New London Ave, West Warwick	0.042	1	$37,648	Q4, FY23	N
24	N Main St NSF, North Smithfield	0.515	17	$490,668	Q4, FY22	Y
25	Myrtle St, PAW, Pawtucket	0.119	0	$412,880	Q4, FY22	Y
26	Market St WAN, Warren	0.277	2	$286,961	Q4, FY22	Y
27	Lisbon St, Providence	0.795	3	$1,620,729	Q2, FY23	Y
28	Legion Way, Barrington	0.080	1	$85,967	Q4, FY22	Y
29	Ledge St, Providence	1.111	1	$1,742,775	Q2, FY23	Y
30	Holland St, Cranston	0.387	35	$790,055	Q3, FY23	N
31	Herbert St, Providence	0.239	16	$527,561	Q1, FY23	N
32	Haven Ave, Cranston	1.277	90	$1,516,444	Q3, FY23	N
33	Great Rd, North Smithfield	0.040	5	$100,801	Q1, FY23	N
34	Garden St, Cranston	0.159	19	$185,474	Q1, FY23	N
35	Fenner St, Pawtucket	0.679	58	$877,353	Q4, FY23	N
36	Felix St, PVD, Providence	0.297	0	$695,884	Q2, FY23	Y
37	Ernest St, Providence	0.688	0	$196,049	Q1, FY23	Y
38	Elizabeth Dr, North Providence	0.220	25	$258,366	Q2, FY23	N
39	Cherry St, Pawtucket	0.509	35	$930,261	Q1, FY23	Y

Attachment RR-4

Of the replacement projects in FY 2022 where the Company was unable to abandon the old mains, please provide the following information:

a. The number of old mains still in service, if any;
b. The location of each;
c. The length of miles of each;
d. The number of services that are yet to be changed out;
e. The capital cost of each pipeline that was intended to replace the old main;
f. The estimate of when each of the old mains is forecasted to be abandoned; and
g. Whether the identified main that was installed next to the old main has been put into rate base or whether the Company is proposing to put the capital cost into rate base with this year's ISR filing.

a	b	c	d	e	f	g
# Old Mains	Project Location	Miles to be abandoned	Services to be completed	Capital cost of each pipeline[1]	Estimate when old main will be abandoned	To be included in FY22 ISR filing[2]
40	Carver St, Pawtucket	0.449	26	$467,244	Q1, FY23	Y
41	Camp Av, North Kingston	0.605	11	$981,785	Q4, FY22	N
42	Butler St, Central Falls	0.651	78	$775,710	Q3, FY23	N
43	Brown Ave, North Providence	0.245	28	$449,138	Q1, FY23	N
44	Branch Av, PVD, Providence	0.602	26	$1,395,598	Q2, FY23	Y
45	Blackstone St, WSO, Woonsocket	0.429	29	$704,863	Q2, FY23	Y
46	Beverage Hill Ave, Pawtucket	0.560	50	$884,004	Q2, FY23	Y
47	Ballou St, Woonsocket	0.568	54	$805,133	Q2, FY23	N
48	Amy St, PVD, Providence	0.249	10	$268,018	Q2, FY23	Y
49	392-550 Valley St, Providence	0.660	2	$1,352,361	Q1, FY23	Y
50	392-498 Douglas Av, PVD, Providence	0.572	53	$1,181,994	Q2, FY23	N
51	380-433 Lonsdale Ave, Pawtucket	0.642	73	$819,004	Q4, FY23	N
52	3073-3416 West Shore Rd, Warwick	0.717	45	$1,262,619	Q2, FY23	N
53	2790-3055 W Shore Rd, WWK, Warwick	0.979	3	$1,544,230	Q2, FY23	Y
54	2-68 Homewood Ave, North Providence	0.498	56	$559,839	Q2, FY23	N
55	208-321 Warren Ave, East Providence	1.075	22	$1,755,228	Q4, FY22	Y
56	1-75 East Ave, Pawtucket	0.520	8	$367,514	Q4, FY23	N
57	1-120 Tuckerman Ave, Middletown	0.420	16	$470,625	Q1, FY23	Y
58	10-67 Jefferson Blvd, Warwick	0.660	1	$749,961	Q4, FY22	Y
		29.170	1,344	$40,630,545		

1. Capital cost is pre-construction estimate.
2. Forecast is as of 2/28/2022.

Record Request No. 5

Request:

Explain the difference between the two amounts for budget and projected capital additions placed in-service for FY 2023 on bates page 69 of the plan for the Wampanoag Trail and Tiverton Gate State Heaters Replacement and Ownership Transfer.

Response:

The difference between the FY23 budget and the projected capital additions placed in-service ("capital additions") for FY23 is that the capital additions for FY23 also include the spending forecasted for FY22, which will also be placed in-service in FY23.

Record Request No. 6

Request:

What is the differential in the cost if Enbridge replaced its heaters as opposed to the cost The Narragansett Electric Company will incur to do it?

Response:

The incremental cost for Enbridge to construct the heaters to Narragansett's design standards is $1.727M more for Tiverton and $1.377M more for Wampanoag Trail. This cost is the same regardless of which company ultimately owns the heaters.

Record Request No. 7

Request:

What were the capitol costs associated with the Crary Street station and were they included in the ISR or in rate base?

Response:

The Narragansett Electric Company ("Narragansett") incurred direct capital charges of $1.262 million associated with the Crary Street Station project, which were included in the ISR. The $1.256 million spending that occurred prior to September 1, 2018 was recovered in the ISR and subsequently, recovery was transferred to base distribution rates. Additionally, as part of its construction of the incremental lateral and Crary Street Station, Algonquin Gas Transmission ("Enbridge") constructed distribution assets on behalf of Narragansett, which totaled $8.850 million. Those facilities have since been conveyed to Narragansett. Enbridge receives payment for the conveyed facilities as part of the AFT-CL transportation contract with Narragansett for service on the Crary Street lateral.

Prepared by or under the supervision of: Nathan Kocon and Melissa Little

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Record Request No. 8

Request:

If Enbridge replaced the heaters at Wampanoag Trail and Tiverton, would it issue an immediate surcharge or have to wait until the next rate case? If not, does all of that equipment get rolled over into rate base that gets paid by all transmission customers or would it be isolated to The Narragansett Electric Company in their next rate case?

Response:

The rates charged by interstate pipelines for gas transportation service are regulated by the Federal Energy Regulatory Commission ("FERC"). Under cost-of-service ratemaking, rates are designed based on the pipeline's cost of providing service and include the pipeline's operating and maintenance expenses for the equipment owned by the pipeline at gate stations. At gate stations, both the pipeline and the interconnecting party will have obligations related to the ownership, operation and maintenance of the on-site equipment. These obligations are typically documented under an operation and maintenance agreement that is a separate agreement from the gas transportation contract; the pipeline does not assess charges under the operation and maintenance agreement for the interconnect activities as these are captured as part of their overall cost-of-service and applied to the transportation agreement.

At the Wampanoag Trail gate station, Algonquin currently owns, operates and maintains two water bath heaters that were installed in 1967. Algonquin has agreed that the heaters are nearing their end of useful life and require replacement. During discussions with Algonquin on this issue, Narragansett expressed a desire to begin owning heaters at the various gate stations once replacement is complete, but that ownership transfer was subject to The Narragansett Electric Company ("Narragansett") approving the design specifications of the new heaters. The design offered by Algonquin under the pipeline's cost-of service only provides for the installation of a single heater at the site; this design does not meet Narragansett's standards to allow for the transfer of ownership once in service. Algonquin and Narragansett previously contemplated entering into a negotiated rate surcharge agreement whereby Algonquin was willing to construct and install a two-heater option to Narragansett's safety and operational specifications and following the completion of the replacement project, ownership and maintenance responsibilities of the heaters would transfer from Algonquin to Narragansett.

Because Algonquin's cost-of-service does not cover the full cost of the project scope requested by Narragansett, Algonquin and Narragansett previously contemplated use of a surcharge to an existing transportation agreement to effectuate the reimbursement from Narragansett to Algonquin for the incremental costs associated with Narragansett's design specifications over a

period of up to five (5) years as a surcharge to Narragansett's firm transportation agreement number 90106 with Algonquin beginning November 1, 2022. As Algonquin and Narragansett continued discussions related to the replacement of heaters and transfer of ownership because ownership was to transfer from Algonquin to Narragansett as of the date the heaters were declared in service, it was determined that the proposed surcharge mechanism that enabled Algonquin to collect a return and depreciation over the five-year surcharge period was not preferred by Narragansett on behalf of its customers to fund this project. Further, because ownership and maintenance expenses related to the heaters will be transferred to Narragansett once in-service, this asset is expected to be removed from Algonquin's rate base in the pipeline's next rate case filing at the FERC which is required to occur by June 1, 2024.

Therefore, Narragansett believes that the ownership arrangement will not result in significantly higher costs to Narragansett customers than the surcharge option until such time as Enbridge files its next base rate case because under the surcharge option, the incremental costs, including Enbridge's return on investment associated with building the heaters to National Grid standards would have been recovered from customers over a five year period rather than depreciated in accordance with Narragansett's depreciation schedule. In addition, although Enbridge will not remove the old heaters from its rate base and adjust its maintenance expenses associated with the heaters until its next base rate case, the remaining investment cost in Enbridge's rate base is likely to be small given the age of the heaters. Given PPL's commitment to not file a rate case for three years following acquisition of the Narraganset assets, the Company's customers will not see their rates increase for the associated maintenance cost for the heaters until PPL files a base rate case.

Finally, the primary driver for taking ownership of the heaters is to take control for inspection and maintenance of the heaters, which we believe will improve reliability by reducing risk of under or over pressurization of Narragansett's gas system.

Record Request No. 9

Request:

Is there an offsetting agreement with Enbridge for the $10 million transfer of ownership cost they will avoid or will they have to wait until they file their next rate case at FERC?

Response:

Please see the Company's response to Record Request No. 8.

Prepared by or under the supervision of: Samara Jaffe

Record Request No. 10

Request:

Is the heater replacement ownership happening with National Grid's NY affiliates?

Response:

Yes, there are heater replacement ownership transfer agreements in place in New York for the Company's New York affiliates.

Record Request No. 11

Request:

Please resubmit a revised answer to 2-12. In the revised answer, provide the maintenance and design practices that were assumed to occur without an ownership transfer and the practices that were assumed to occur with an ownership transfer, thereby illustrating the difference between the two scenarios used to support the claims that decision to own had both improvement in redundancy design and operations and maintenance that the Company used in deciding to purchase the Wampanoag Trail and Tiverton heaters?

Response:

With Ownership Transfer:

- **Heaters**
  - **Design** - The Narragansett designs for the Waterbath systems at Wampanoag Trail would be fully redundant Programmable Logic Controlled (PLC) heaters that would allow a continuation of heat in the event of a single heater outage. In the event of extreme cold resulting in gas flows higher than expected, extra heat could be used to supplement the output of one heater. The same is true for Tiverton boilers but in addition to multiple heaters there are redundant heat exchangers used to heat the gas. The heat exchangers are known to be a single point of failure that could result in a long outage due to the time it takes to repair. Heating systems at both locations also have a Burner Management System (BMS) and safety instrumented shutdown (SIS) system that prevent high temperature, high pressure events, and accidental ignition events based on guidance from ASME-CSD-1 and NFPA 87.

  - **Operations** - The safety and reliability benefits of Narraganset's design standards are best realized through operation and maintenance of the systems by Narragansett. The heaters can be staged to provide varying levels of output that adapt to changing flows on the system to improve efficiency and mitigate the risk of overheating or underheating the system during seasonal flow changes. Narragansett will also be able to ensure the integrity of the assets are not weakened or compromised during both standard and transient operations including startup and shutdown. Additionally, Narragansett' geographic proximity to the systems allows it to better respond to failures and its knowledge of the control systems allows for on-screen troubleshooting to be performed more quickly in the event of a failure.

- **Maintenance** - Narragansett technicians perform monthly visual inspections to the heaters which helps locate potential issues before there is a failure and perform proactive repairs if necessary. Technicians also perform periodic glycol sampling which would be used to monitor the quality of the glycol to ensure proper heat transfer and additional feedback on the condition of the heat exchanger internal to the Waterbath at Wampanoag Trail and the external heat exchangers at Tiverton. Functional testing would also be performed at both locations to improve time-in-service, performance, and identify latent safeguard deficiencies.

- **Tiverton Regulator Station**
  - **Design** - Three levels of overpressure protection to mitigate the risk of overpressurization of the single feed system in Tiverton. Gas detection and flame detection improves the ability to respond to gas releases and ignitions at the facility.
  - **Operation** - Remote control of the gas pressure system based on downstream pressure conditions. Improved management of change including with equipment, personnel, technologies, and downstream customer needs.
  - **Maintenance** - Annual boot replacements of boot regulators. Monthly visual inspections of the regulators and regulator station equipment. Risk assessments and condition assessments every three years to monitor the health of the regulator station equipment. Proactive replacement of regulators based on obsolescence and failure history. Management of cathodic protection and other means of corrosion control at the facility.

Without Ownership Transfer:

- **Heaters**
  - **Design** (Assuming Enbridge Design) - The pipeline supplier design for the heaters at Wampanoag Trail would be a single heater without redundancy. The controls and safety package would be fully pneumatic without programmable logic, burner management system, or a safety shutdown system. The heater design at Tiverton would be a single heater and heat exchanger without redundancy or a safety shutdown system beyond was is already provided from the boiler manufacturer. Both systems would not have a backup heating system in the event of a heater failure and may require on site intervention.

- **Operation** - The pipeline supplier would not have experience with the Narragansett controls package and would require manual on-site changes to adapt to flow conditions. The troubleshooting in the event of a failure would also be based on current practices without help from on-screen interfaces. Narragansett customers would be relying on the pipeline supplier for executing transient operations and recognizing deviations independent of downstream conditions and operations.
- **Maintenance** - To our knowledge there would be no glycol sampling. Annual visual and manual inspection is required by the pipeline operator, but they currently do not have the knowledge to perform functional testing on Narragansetts heater equipment design and there is currently no insight into the tracking of condition monitoring results. Most of the maintenance and replacement on existing equipment has been reactive in the past compared to proactive.

- **Tiverton Regulator Station**
  - **Design** (Assuming Enbridge Design) - Enbridge would only provide two layers of over pressure protection. The station would not have gas detection or flame detection in the building.
  - **Operation** - Remote control of the station would not be used to improve pressure conditions to downstream customers. Narragansett would not have control over Management of Change at the facility.
  - **Maintenance** - Boot replacement would not take place annually, which has led to failures at other jointly owned stations in the past. Proactive replacement of equipment despite annual testing could not be ensured. Some annual testing such as flame detection and gas detection would not be required because they are not required for design. Replacement of obsolete regulator models has not taken place in the past. Cathodic Protection and other corrosion related maintenance would have to be performed by the pipeline supplier.

Please note that the Company's response to Record Request 12 provides a comparative analysis of the risks and financial impacts associated with the transfer of ownership to Narraganset versus Enbridge retaining ownership of the assets.

Record Request No. 12

Request:

What could the Company accomplish by Enbridge's requirement to supply The Narragansett Electric Company with some reliable capacity and what could only be accomplished because The Narragansett Electric Company owns the proposed Wampanoag Trail and Tiverton equipment?

Response:

The differences can be seen in more detail in the "Operate" and "Maintenance" section of the Company's response to Record Request No. 11. The key advantage is that overall management of change and asset integrity is ensured throughout the lifecycle of the asset, and the customer requirements are not dependent on pipeline operations and standards. The benefits of The Narragansett Electric Company ("Narragansett") purchasing the assets were analyzed in a presentation to National Grid management in September 2021, which is included as Attachment RR 12-1. New cost/risk tables and charts have been prepared and attached based on an updated risk analysis. See Attachment RR-2.Net Present Value was not updated due to uncertainty around discounting risk in an NPV analysis using Narragansett's internal methods of value analysis.

Below is a breakdown of the new tables and charts which include a summary of the results and a detailed overview of how the results were derived and the assumptions were made:

- Results
    1. Wampanoag Trail Heaters
        - If the average annual ISR costs and risks (charts 5-6) are compared on an annual basis excluding, supply costs, i.e. any change in Enbridge rates, as well as future replacement costs, the cost to the customers if the design and O&M responsibility remained with Enbridge would be lower by approximately $107,000 per year. The increased annual risk compared to the risk of Narragansett's design and O&M begins to exceed this amount after year 1.
        - If the design is changed to the Narragansett design, but Enbridge retains O&M responsibility, the cost to the customer would be lower by approximately $80,000 per year. The increased annual risk associated with Enbridge O&M begins to exceed this amount around year 10 although this time will likely be reduced when Enbridge rates are adjusted to reflect Enbridge's additional cost of service attributable to the facilities.

Record Request No. 12, page 2

This option also assumes the additional equipment required for Narragansett's design would be considered ISR costs. However, this would further complicate the demarcation of responsibility for maintenance, standard operations, as well as emergency response.

- Chart 4 compares the customer impact of all three options, which is the annualized risk and future replacement cost impact of the heaters. It shows that comparatively the impact of the Narragansett Design and O&M responsibilities will be at a premium to the customers up until 10 years of service life if the design of the assets are not upgraded to the Narragansett design and 27 years of service life if the O&M responsibilities are not transferred.
- However, this is assuming increased supply cost adjustments are not considered. If considered, this could increase the impact of the Enbridge O&M curves by around $500,000 annually once adjusted and reduce the impact premium times significantly. This would not be confirmed until the supply cost increases take place in the context of an Enbridge rate adjustment.

2. Tiverton Heaters and Regulator Station Replacement
    - If the average annual ISR costs and risks (charts 11-12) are compared on an annual basis and supply costs as well as future replacement costs are not considered, the cost to the customers if the design and O&M arrangement stays with Enbridge would be lower by approximately $99,000 per year. The increased annual risk begins to exceed this amount around approximately year five although this time will be reduced when supply costs adjustments are made.
    - If the design is changed to the Narragansett design but Enbridge retains O&M responsibility the cost to the customer would be lower by approximately $64,000 per year. The increased annual risk begins to exceed this amount around year 11 although this time will be reduced when supply costs increase. Like the Wampanoag Trail project, this option also assumes the additional equipment required for Narragansett's design would be considered ISR costs and would further complicate the demarcation of responsibility for maintenance, standard operations, as well as emergency response.

Record Request No. 12, page 3

- Chart 10 shows that the annualized risk and future replacement cost impact of the heaters and regulator station will be at a premium to the customers up until 10 years of service life if the design of the assets are not upgraded to the Narragansett design and 21 years of service life if the O&M responsibilities are not transferred.
- However, this is assuming increased supply cost adjustments are not considered. If considered, this could increase the impact of the Enbridge O&M curves by around $500,000 annually and reduce the impact premium times significantly although this would not be confirmed until the supply cost increases take place.

- Tables and Charts detailed overview:

Wampanoag Heaters:

1. The probability of overheating failure (column two) of the tables is currently low because it requires heaters to over-fire and regulators to fail due to the excess heat. The probability that the heater overfires is low due to it being undersized in its current state. In addition, Narragansett Electric retrofitted its outlet valve of the station into an OPP valve which is a mechanical valve and is relatively heat resistant compared to boot regulators.
2. The consequence of an overpressure (column 3) is low assuming that downstream piping and regulators could handle the overpressure but this may not always be the case and there could be downstream failures or precautionary shutdowns that were not considered depending on the time of year.
3. The probability of an underheating failure (column 5) requires a heating system failure and moisture or hydrates in the gas that would freeze up the regulators.
4. The consequence of this failure (column 6) is calculated based on the average of 38,000 customers dependent on this system throughout the year that would be without gas.
5. Assumptions have been made in order to adjust probabilities of failure based on maintenance practices of the responsible party and failure prevention multipliers (column 9) are used to adjust for redundancy of design and operational readiness to respond to failures.
6. Probability, consequence, and the failure prevention adjustment are multiplied to calculate risk and the two risks are added to show how the risk of the asset (column 10) varies with time (column 1) using either the Enbridge Design and Enbridge O&M, Narragansett Design and Enbridge O&M, or Narragansett Design and Narragansett O&M.

Record Request No. 12, page 4

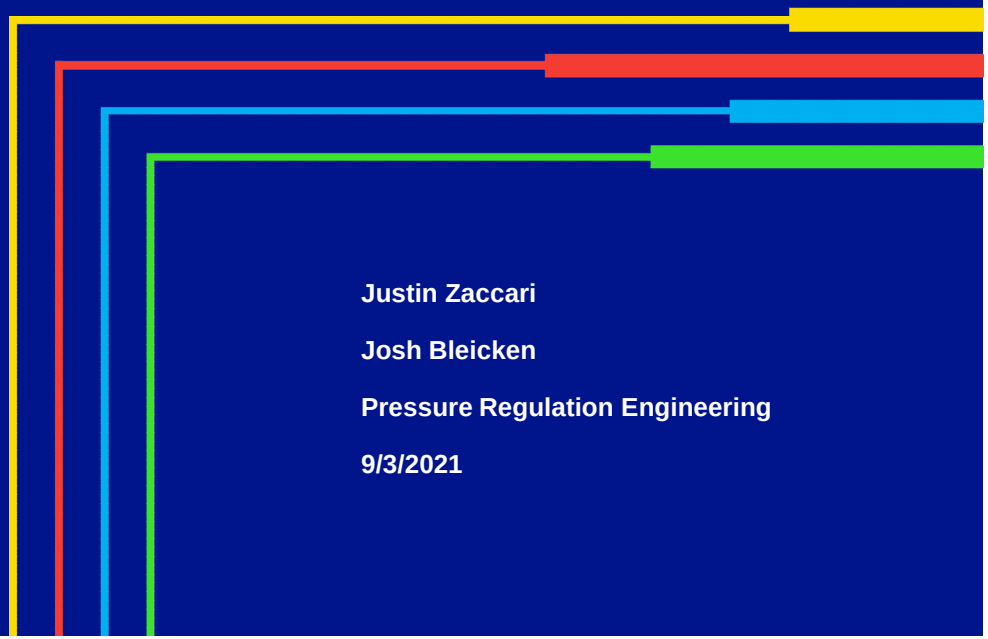
7. In addition to risk over time, the average annual cost is shown (Column 11) based on the total ISR cost divided over 50 years as well as an annualized future replacement cost (column 12) based on the future ISR cost divided by increasing years the asset is in service.
8. Using these values, the asset impact (column 13, charts 1-4) is calculated which measures the trade off between increasing risk versus replacement cost avoidance.
9. The differential annual cost (column 14) and differential annual risk (column 15) are compared to show the lower costs and higher risks over time for Enbridge to retain O&M responsibilities and using either the Narragansett or Enbridge Design (charts 5-6).

Tiverton Heater and Regulation

- The process of reading the tables and charts for the Tiverton project are the same as 1-9 above but the heating system risks, and the regulator station risks must be calculated separately and added together for the total station risk.

Importantly, through the Company's discussions with Enbridge, it was established that: (1) the cost to the Company of construction of the Tiverton and Wampanoag facilities by Enbridge would be the same whether they were ultimately owned by Enbridge or the Company, and (2) if the facilities were constructed to the Company's standards, the Company would have to assume responsibility for operation and maintenance through an appropriate agreement whether or not ownership was transferred as proposed.

Tiverton GS Heat and Regulation & Wampanoag Trail GS Heat O&M Transfer from Enbridge



Justin Zaccari

Josh Bleicken

Pressure Regulation Engineering

9/3/2021

nationalgrid

Tiverton GS: Current Status

Risk Level: Medium **(Single Feed)**

Impacts:

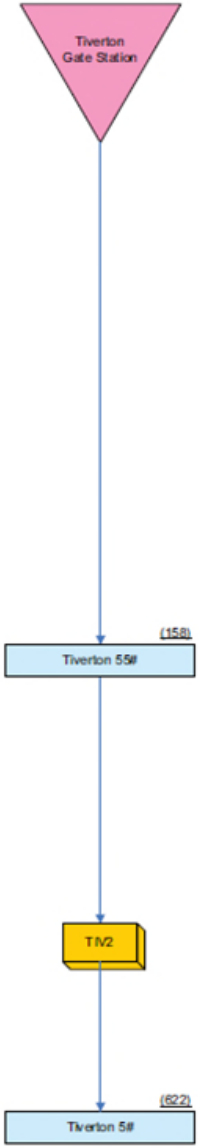
Outage: **~800 Customers** Overpressure: **Max ~800 Customers** (dependent on National Grid's relief valve operation and effects to distribution system)

Threats:

1: A control regulator or monitor regulator on both runs fail closed due to age, maintenance, debris etc. which results in an outage of all 800 customers downstream of the Gate Station.

2: A control regulator fails open on one of the runs and the monitor regulator fails to close on demand which results in an overpressure of 750 psig gas into the 55 PSI system affecting approximately 160 directly fed customers and potentially an additional 600 customers downstream in the 5 PSI system depending on NG relief valve's ability to mitigate overpressure.

Two layer station with Fisher 399 and Grove 83 regulators pictured above which are both obsolete.



Tiverton GS: Current Status

Wampanoag GS: Current Status

- Overpressure Risk Level: Medium-Low
- Impact: Max ~8,500 customers (dependent on NG 3rd layer of OPP/season/response time)
- Outage Risk: Medium-High
- Impact: Max ~19,000 customers (dependent on season/response time)

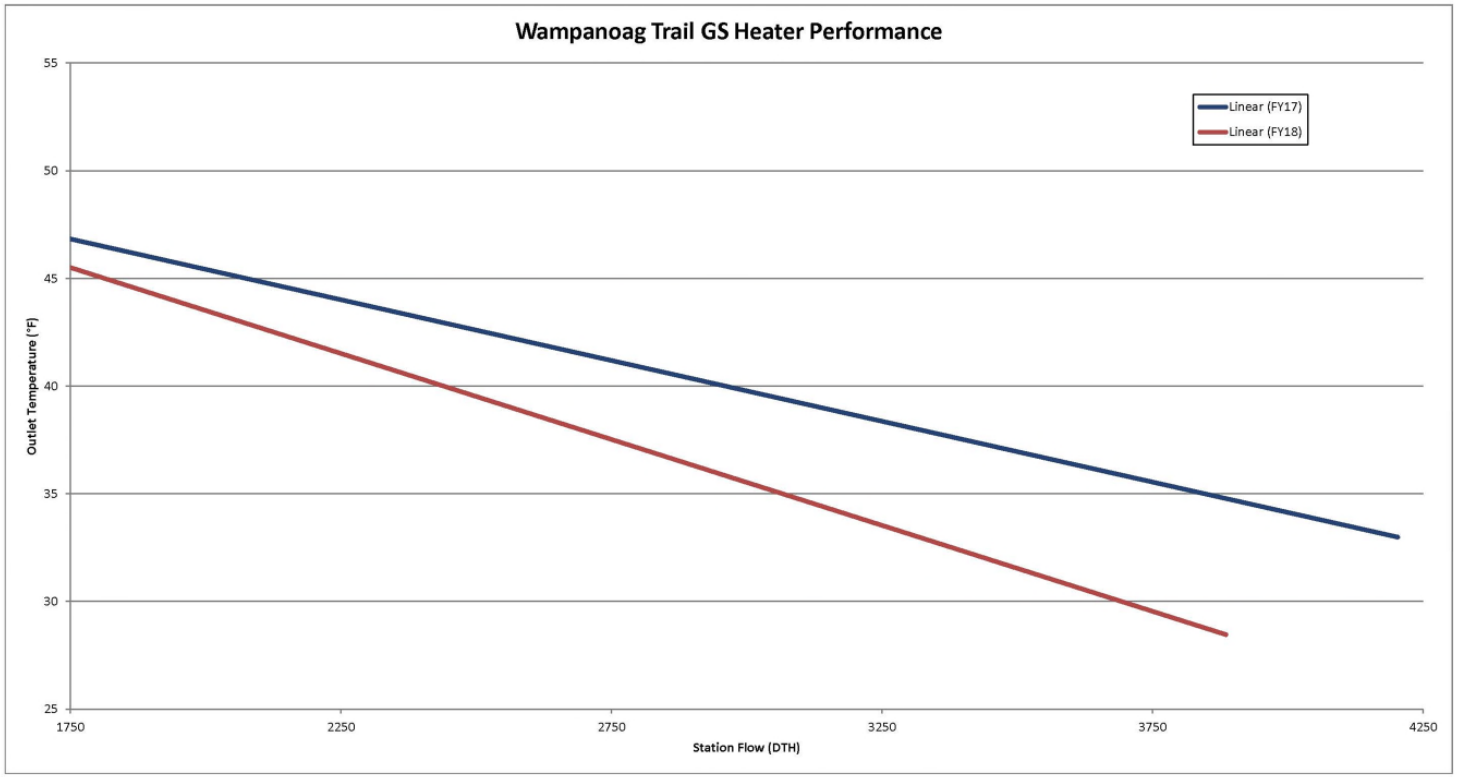
Threats:

1: Heater performance failure results in cold gas which may result in a loss of pressure control at the regulator station. Boot style regulators tend to fail open while actuated ball valve regulators (National Grid) may fail open or closed on demand resulting in either an overpressure of 750 PSIG in the many distribution systems or a major outage of the downstream systems, both affecting thousands of customers.

2: Heater control failure during low flow conditions may result in overheated gas that could melt boot style regulators and overpressurize the downstream distribution systems with 750 PSIG gas.

Heaters at end of life, inadequate heater performance-unable to meet peak capacity.

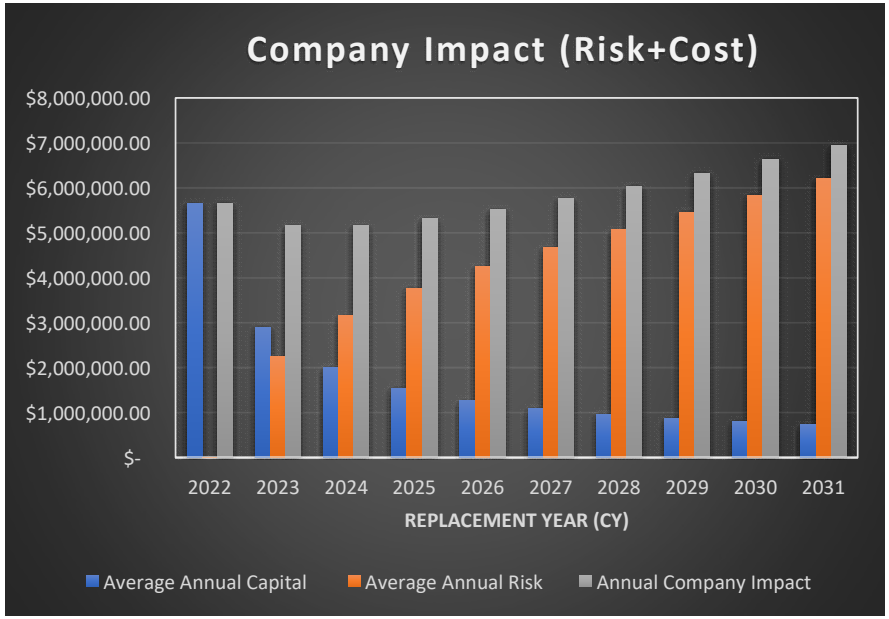
Heater Performance Data



Risk Analysis-Tiverton

Before Rebuild			Before Rebuild		
Probability of Failure	Impact	Overpressure Risk	Probability of Failure	Impact	Outage Risk
16%	$ 17,800,000	$ 2,927,081	13%	$ 8,000,000	$ 1,040,000
After Rebuild			**After Rebuild**		
Probability of Failure	Impact	Overpressure Risk	Probability of Failure	Impact	Outage Risk
0.00004%	$ 17,800,000	$ 8	0.025%	$ 8,000,000	$ 2,035
	Current Risk	10 Year Risk Reduction	Project Cost		
	$ 3,967,081	$ 10,322,082	$ 5,486,000		

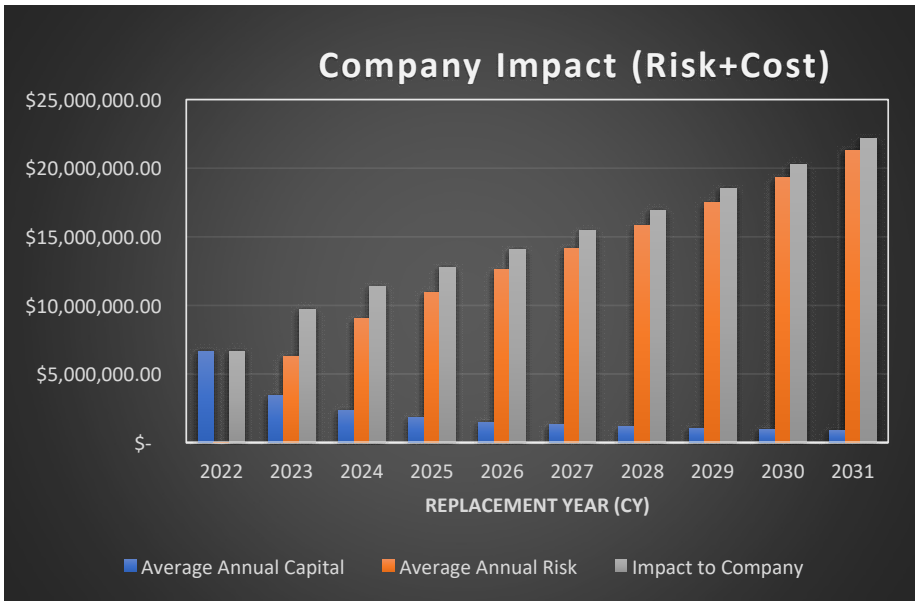
- **The 10-year economic optimum for the company to rebuild the station based on the annual risk and annual cost of replacing the station is 2023. Although replacing the station in 2022 would lead to the largest 10-year risk reduction.**



Risk Analysis-Wampanoag

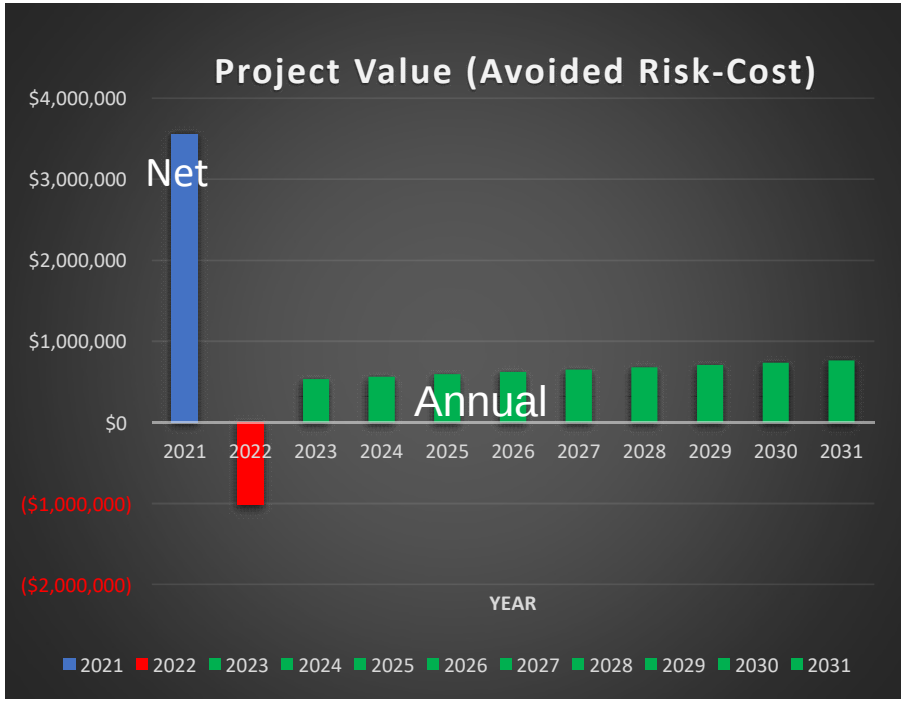
Before Rebuild			Before Rebuild		
Probability	Impact	Overpressure Risk	Probability	Impact	Outage Risk
10%	$ 4,800	$ 480	25%	$ 46,770,601	$ 11,692,650
After Rebuild			**After Rebuild**		
Probability	Impact	Overpressure Risk	Probability	Impact	Outage Risk
0.0001%	$ 4,800	$ 0.005	0.005%	$ 46,770,601	$ 2,339
	Current Risk	10 Year Risk Reduction	Project Cost		
	11693130.33	$ 42,684,032	$ 6,486,000		

- **The 10 year economic optimum for replacing the station has already passed its economic optimum for the company to rebuild the station and rebuilding in FY22 would result in the largest 10-Year risk reduction**



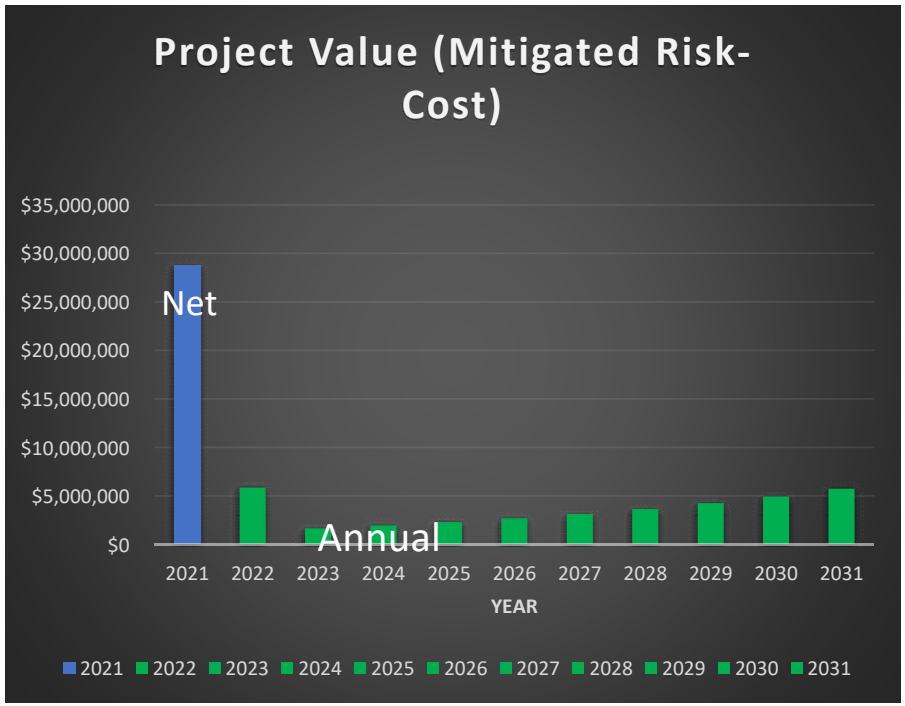
Value Analysis-Tiverton

- **Replacement of the station in FY22 would be a net positive value of $3.5M project based on the value of avoided safety and reliability risk and cost over 10 years.**



Value Analysis-Wampanoag Trail

- **Replacement of the station in FY22 would be a net positive value of 27M based on the value of avoided safety and reliability risk and cost over 10 years.**



Advantages of National Grid Gate Station Design and Operating Standards

Tiverton Gate Station:

1. Guaranteed 3 levels of overpressure protection and reliable heat at Tiverton GS which greatly mitigates overpressure risk.
2. Proactive station maintenance including annual regulator boot replacement and monthly station checks at Tiverton GS greatly mitigates outage risk of the single feed system.

Wampanoag Trail Gate Station:

1. National Grid having the ability to control Wampanoag Trail Heater setpoints with its modern PLC system improves heater efficiency and reduces risks associated with GSO changing flows through the station.
2. National Grid SIL certified heater safety system greatly mitigates the potential of overheated gas which may melt regulator soft goods.

Both Locations:

1. Fully redundant heating systems at both locations effectively enhances the heating system reliability at both locations.
2. The ability to perform heater maintenance and repairs without station shutdown or heater bypass improves overall gate station reliability at both locations.
3. Verifiable inspection and maintenance records for the new assets .
4. Overall, less dependency on the pipeline operators to operate and maintain safety critical equipment.

Enbridge Initial Proposal-Tiverton

Initially, estimates were developed for both a new station design following National Grid design requirements and a new station design following Enbridge design requirements. The difference between both options was calculated and it was assumed National Grid would reimburse through its tariff agreements with Enbridge. $1.727M for Tiverton and $1.377M for Wampanoag Trail.

Tiverton GS

Cost Component	National Grid Option ($MM USD)	Enbridge Only Option ($MM USD)	National Grid Differential Cost ($MM USD)
Engineered Equipment, all process related materials inside and including the buildings	509,000	214,000	295,000
Environmental	115,000	103,000	12,000
Construction	1,176,000	471,000	705,000
Land & ROW	476,000	428,000	48,000
Engineering	250,000	125,000	125,000
Construction Management, Inspection, & Commissioning	804,000	603,000	201,000
Project & Engineering Management, Support Groups, Operations	364,000	274,000	90,000
Total Base Cost Estimate	3,694,000	2,218,000	1,476,000
Contingency (15%)	554,000	333,000	221,000
Total Present Day Cost Estimate			
Potential Market Escalation (2%)	74,000	44,000	30,000
Total Escalated Cost Estimate			
AFUDC <as applicable>	0	0	0
Total Estimate w/ AFUDC	4,322,000	2,595,000	1,727,000

Wampanoag Trail GS

Option 1 (Two Heaters)- Cost Estimate

Cost Component	($1000 USD)	($MMUSD)
Project Development	$ 9	$ 0.01
Project Management Team (PM, construction, Safety, Project controls, Craft inspection)	$ 626	$ 0.63
Engineering (Eng company, internal Eng support)	$ 218	$ 0.22
Operations (Ops hours, Reserve and Envent equipment)	$ 120	$ 0.12
Support groups (SCM, Env, legal, SCADA, etc.)	$ 147	$ 0.15
Land/ROW related costs	$ 257	$ 0.26
Material & Equipment	$ 1,338	$ 1.34
Construction	$ 1,261	$ 1.26
Total Base Cost Estimate	$ 3,976	$ 3.98
Contingency (15.7%) (See note above)	$ 623	$ 0.62
Total Present Day Cost Estimate	$ 4,598	$ 4.60
Potential Market Escalation (2.9%) (See note above)	$ 115	$ 0.12
Total Escalated Cost Estimate	$ 4,713	$ 4.71
AFUDC	$ 91	$ 0.09
Total Estimate w/ AFUDC	$ 4,805	$ 4.80

Estimated accuracy range of -40% / +50%

Option 2 (One Heater)- Cost Estimate

Cost Component	($1000 USD)	($MMUSD)
Project Development	$ 9	$ 0.01
Project Management Team (PM, construction, Safety, Project controls, Craft inspection)	$ 514	$ 0.51
Engineering (Eng company, internal Eng support)	$ 170	$ 0.17
Operations (Ops hours, Reserve and Envent equipment)	$ 104	$ 0.10
Support groups (SCM, Env, legal, SCADA, etc.)	$ 131	$ 0.13
Land/ROW related costs	$ 257	$ 0.26
Material & Equipment	$ 647	$ 0.65
Construction	$ 1,005	$ 1.01
Total Base Cost Estimate	$ 2,837	$ 2.84
Contingency (15.7%) (See note above)	$ 444	$ 0.44
Total Present Day Cost Estimate	$ 3,281	$ 3.28
Potential Market Escalation (2.9%) (See note above)	$ 82	$ 0.08
Total Escalated Cost Estimate	$ 3,363	$ 3.36
AFUDC	$ 65	$ 0.07
Total Estimate w/ AFUDC	$ 3,428	$ 3.43

Estimated accuracy range of -40% / +50%

Initial Cost Estimates

	Total Project Estimate(+/-50%)	Ownership	Ownership Breakdown	Cost Allocation
Wampanog Tr	$ 4,600,000	Enbridge	20% - 10%	$ 920,000 - $ 460,000
		National Grid	80% - 90%	$ 3,680,000 - $ 4,140,000
Tiverton	$ 4,300,000	Enbridge	20% - 10%	$ 860,000 - $ 430,000
		National Grid	80% - 90%	$ 3,440,000 - $ 3,870,000

- **National Grid reimburses for cost percentage of the heaters at Wampanoag Trail out of the total project cost-approx. 80-90%**
- **National Grid reimburses for cost of regulators and heater at Tiverton GS-approx. 80-90%**

Definitions	
Probability of Failure	Probability that an asset will fail in a given year assuming individual components are run to failure.
Impact	Average estimated financial consequence of a failure occuring in a given year based on number of customers affected and estimated loss of gas and injury related costs.
Detection and Response Multiplier	Likelihood of a response failing that prevents the indicated consequence.
Estimated Risk	Probability of failure multiplied by financial consequence of a failure.
Annual Cost	Future ISR replacement cost/50 years excluding supply costs and depreciation
Annualized Future Replacement Cost	Future replacement cost divided by years in service based on 3% increase/year assuming future replacement follows either no ISR, design difference ISR, or all ISR.
Asset Impact	Annual future cost/years in service plus annual risk (measures tradeoff between risk and how long a company waits to replace an asset
Annual Cost Differential	Difference in annual cost between alternative option versus NG Design and National Grid O&M.
Annual Risk Differential	Difference in annual risk of alternative option versus National Grid Design and National Grid O&M.

Wampanoag Trail Heater Replacement

	Before Rebuild								
Current	Probability of Overheating Failure (heater overfire and regulator soft goods melted)	Impact	Overpressure Risk	Probability of underheating Failure (heater loss and regulator freeze)	Impact	Outage Risk	Total Baseline Risk	Estimated Enbridge Detection and Response Failure % (Heater Undersized, other failures already considered)	Estimated Risk
	0.02%	$49,000	$9	9%	$38,000,000	$3,306,000	$3,306,009	100%	$3,306,009

	After Rebuild to Enbridge Design with Enbridge O&M								After Rebuild to Enbridge Design with Enbridge O&M				
Year	Probability of Overheating Failure	Impact	Overpressure Risk	Probability of underheating Failure	Impact	Outage Risk	Total Baseline Risk	Estimated Enbridge Detection and Response Weighting % (Considers Single Heater Failure and other failures already considered)	Estimated Risk	Annual Cost Excluding Enbridge Rates & Depreciation (Enb design/Enb O&M)	Annualized Future ISR Replacement Cost	Asset Impact (Rate+Annualized Replacement Cost	**Average Annual Cost Differential to Full ISR**	**Annual Risk Differential to Full ISR**
Year 1	0.002%	$49,000	$1	0.5%	$38,000,000	$190,000	$190,001	100%	$190,001	$0	$0	$ 190,001	**$ (106,980)**	**$ 188,794**
Year 10	0.07%	$49,000	$32.95	3.8%	$38,000,000	$1,427,949	$1,427,982	100%	$1,427,982	$0	$0	$ 1,427,982	**$ (106,980)**	**$ 1,342,647**
Year 20	0.25%	$49,000	$123.53	6.0%	$38,000,000	$2,265,651	$2,265,774	100%	$2,265,774	$0	$0	$ 2,265,774	**$ (106,980)**	**$ 2,027,686**
Year 30	0.52%	$49,000	$255.87	7.3%	$38,000,000	$2,757,085	$2,757,341	100%	$2,757,341	$0	$0	$ 2,757,341	**$ (106,980)**	**$ 2,373,914**
Year 40	0.84%	$49,000	$412.22	8.0%	$38,000,000	$3,045,383	$3,045,795	100%	$3,045,795	$0	$0	$ 3,045,795	**$ (106,980)**	**$ 2,545,636**
Year 50	1.18%	$49,000	$580.13	8.5%	$38,000,000	$3,214,512	$3,215,092	100%	$3,215,092	$0	$0	$ 3,215,092	**$ (106,980)**	**$ 2,627,995**

	After Rebuild to NG Design with Enbridge O&M								After Rebuild to NG Design with Enbridge O&M				
	Probability of Overheating Failure	Impact	Overpressure Risk	Probability of underheating Failure	Impact	Outage Risk	Total Baseline Risk	Estimated Enbridge Detection and Response Failure % (Considers Response time and Troubleshooting)	Estimated Risk	Annual Cost Excluding Enbridge Rates & Depreciation-Design Additions NG Design/Enb O&M	Annualized Future ISR Replacement Cost	Asset Impact (Rate+Annualized Replacement Cost	**Average Annual Cost Differential to Full ISR**	**Annual Risk Differential to Full ISR**
Year 1	0.000%	$49,000	$0	0.0%	$38,000,000	$8,471	$8,471	50%	$4,236	$26,740	$1,377,110	$ 1,381,346	**$ (80,240)**	**$ 3,028**
Year 10	0.01%	$49,000	$3.61	1.4%	$38,000,000	$536,589	$536,593	50%	$268,296	$26,740	$179,682	$ 447,978	**$ (80,240)**	**$ 182,961**
Year 20	0.07%	$49,000	$33.63	3.6%	$38,000,000	$1,350,835	$1,350,868	50%	$675,434	$26,740	$120,739	$ 796,173	**$ (80,240)**	**$ 437,346**
Year 30	0.22%	$49,000	$109.85	5.3%	$38,000,000	$2,000,399	$2,000,509	50%	$1,000,254	$26,740	$108,175	$ 1,108,429	**$ (80,240)**	**$ 616,828**
Year 40	0.48%	$49,000	$236.84	6.4%	$38,000,000	$2,440,620	$2,440,857	50%	$1,220,428	$26,740	$109,034	$ 1,329,462	**$ (80,240)**	**$ 720,269**
Year 50	0.84%	$49,000	$410.32	7.2%	$38,000,000	$2,719,233	$2,719,643	50%	$1,359,822	$26,740	$117,226	$ 1,477,047	**$ (80,240)**	**$ 772,725**

	After Rebuild to NG Design with NG O&M								After Rebuild to NG Design with NG O&M				
	Probability of Overheating Failure	Impact	Overpressure Risk	Probability of underheating Failure	Impact (of gas)	Outage Risk	Total Baseline Risk	Estimated NG Detection and Response Failure % (Considers Response Time and Troubleshooting)	Estimated Risk	Annual Cost Excluding Enbridge Rates & Depreciation-NG Design/NG O&M	Annualized Future ISR Replacement Cost	Asset Impact (Rate+Annualized Replacement Cost	**Average Annual Cost Differential to Full ISR**	**Annual Risk Differential to Full ISR**
Year 1	0.000%	$49,000	$0	0.0%	$38,000,000	$4,828	$4,828	25%	$1,207	$106,980	$5,509,953	$ 5,511,160	**$ -**	**$ -**
Year 10	0.01%	$49,000	$3.61	0.9%	$38,000,000	$341,337	$341,341	25%	$85,335	$106,980	$752,995	$ 838,330	**$ -**	**$ -**
Year 20	0.07%	$49,000	$33.63	2.5%	$38,000,000	$952,320	$952,353	25%	$238,088	$106,980	$578,280	$ 816,368	**$ -**	**$ -**
Year 30	0.22%	$49,000	$109.85	4.0%	$38,000,000	$1,533,597	$1,533,707	25%	$383,427	$106,980	$586,152	$ 969,578	**$ -**	**$ -**
Year 40	0.48%	$49,000	$236.84	5.3%	$38,000,000	$2,000,399	$2,000,636	25%	$500,159	$106,980	$636,280	$ 1,136,439	**$ -**	**$ -**
Year 50	0.84%	$49,000	$410.32	6.2%	$38,000,000	$2,347,976	$2,348,387	25%	$587,097	$106,980	$703,829	$ 1,290,926	**$ -**	**$ -**

Tiverton Heater and Regulator Station Replacement

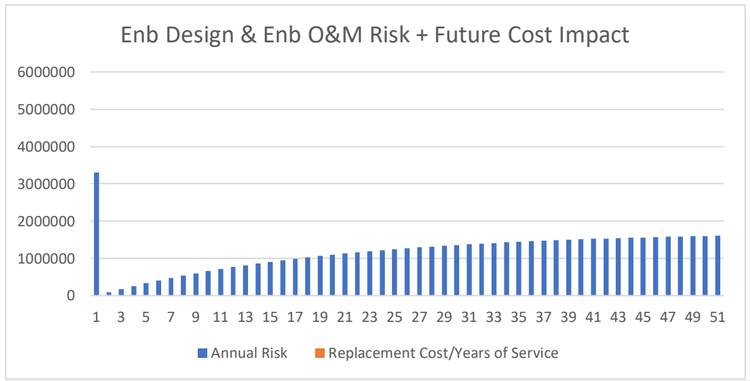
	Before Rebuild										
Current	Probability of Overheating Failure	Probability of Station Fail Open	Impact	Overpressure Risk	Probability of Overheating Failure (heater overfire and regulator soft goods melted)	Probability of Station Fail Closed (Assume regulator Age same as station age)	Impact	Outage Risk	Total Baseline Risk	Estimated Enbridge Detection and Response Failure % (Heater Undersized, other failures already considered)	Estimated Risk
	2.48%	44.97%	$16,076,900	$7,628,936	7.8%	90%	$780,000	$762,042	$8,390,978	100%	$8,390,978.06

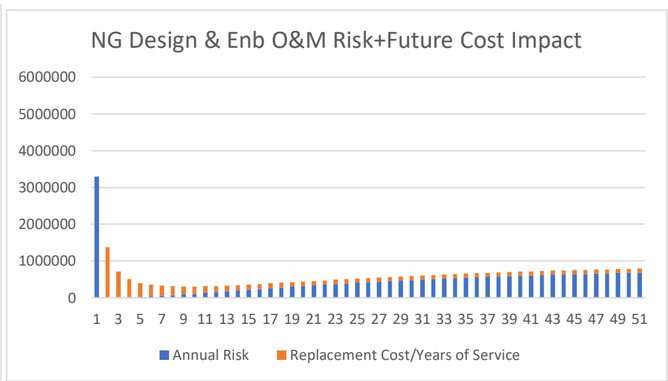
	After Rebuild to Enbridge Design with Enbridge O&M											After Rebuild to Enbridge Design with Enbridge O&M				
	Probability of Overheating Failure	Probability of Station Fail Open	Impact	Overpressure Risk	Probability of Failure	Probability of Station Fail Closed (Assume regulator Age same as station age)	Impact	Outage Risk	Total Baseline Risk	Estimated Enbridge Detection and Response Failure % (Considers Response Distance/ Troubleshooting/Single Feed)	Estimated Risk	Annual Cost Excluding Enbridge Rates & Depreciation- Enb Design/Enb O&M	No ISR Annualized Replacement Cost	Asset Impact (Risk+Annualized Replacement Cost	Average Annual Cost Differential to Full ISR	Annual Risk Differential to Full ISR
Year 1	0.012%	0.127%	$16,076,900	$22,429	0.5%	0.3%	$780,000	$5,668	$28,098	100%/50%	$16,883	$0	$0	$ 16,883	$ (98,580)	$ 16,630
Year 10	0.52%	6.75%	$16,076,900	$1,167,793	3.8%	13.5%	$780,000	$134,582	$1,302,375	100%/50%	$718,478	$0	$0	$ 718,478	$ (98,580)	$ 688,323
Year 20	1.31%	19.88%	$16,076,900	$3,406,641	6.0%	39.8%	$780,000	$356,619	$3,763,260	100%/50%	$2,059,939	$0	$0	$ 2,059,939	$ (98,580)	$ 1,939,318
Year 30	2.07%	35.36%	$16,076,900	$6,017,650	7.3%	70.7%	$780,000	$608,171	$6,625,821	100%/50%	$3,616,996	$0	$0	$ 3,616,996	$ (98,580)	$ 3,353,225
Year 40	2.74%	51.36%	$16,076,900	$8,696,643	8.0%	102.7%	$780,000	$863,710	$9,560,353	100%/50%	$5,212,031	$0	$0	$ 5,212,031	$ (98,580)	$ 4,761,706
Year 50	3.30%	66.93%	$16,076,900	$11,290,273	8.5%	133.9%	$780,000	$1,110,115	$12,400,388	100%/50%	$6,755,252	$0	$0	$ 6,755,252	$ (98,580)	$ 6,084,309

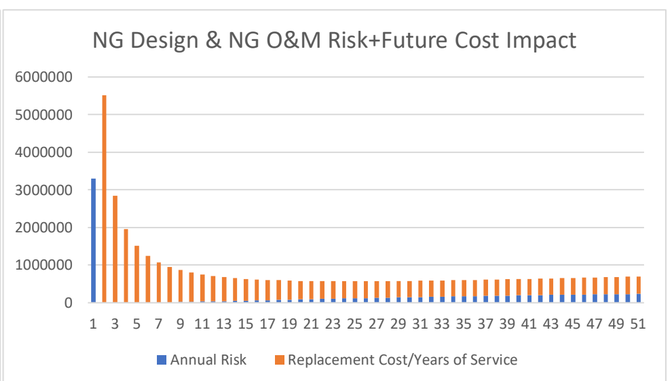
	After Rebuild to NG Design with Enbridge O&M											After Rebuild to NG Design with Enbridge O&M				
	Probability of Overheating Failure	Probability of Station Fail Open	Impact	Overpressure Risk	Probability of Failure	Probability of Station Fail Closed (Assume regulator age same as station age)	Impact	Outage Risk	Total Baseline Risk	Estimated Enbridge Detection and Response Failure % (Considers Response Distance, Troubleshooting, and single feed Station/Heater)	Estimated Risk	Annual Cost Excluding Enbridge Rates & Depreciation- NG Design/Enb O&M	NG Design Cost Difference ISR Annualized Replacement Cost	Asset Impact (Risk+Annualized Replacement Cost	Average Annual Cost Differential to Full ISR	Annual Risk Differential to Full ISR
Year 1	0.000%	0.0007%	$16,076,900	$112	0.0%	0.2%	$780,000	$1,900	$2,012	50%/50%	$1,006	$34,540	$1,778,810	$ 1,779,816	$ (64,040)	$ 754
Year 10	0.01%	0.3263%	$16,076,900	$53,645	1.4%	13.6%	$780,000	$117,444	$171,089	50%/50%	$85,545	$34,540	$232,094	$ 317,639	$ (64,040)	$ 55,389
Year 20	0.07%	1.8475%	$16,076,900	$308,052	3.6%	43.2%	$780,000	$364,892	$672,944	50%/50%	$336,472	$34,540	$155,958	$ 492,430	$ (64,040)	$ 215,851
Year 30	0.22%	4.7940%	$16,076,900	$806,769	5.3%	81.1%	$780,000	$673,743	$1,480,513	50%/50%	$740,256	$34,540	$139,729	$ 879,986	$ (64,040)	$ 476,485
Year 40	0.48%	9.0670%	$16,076,900	$1,535,392	6.4%	123.2%	$780,000	$1,010,830	$2,546,222	50%/50%	$1,273,111	$34,540	$140,838	$ 1,413,950	$ (64,040)	$ 822,786
Year 50	0.84%	14.4496%	$16,076,900	$2,457,668	7.2%	166.9%	$780,000	$1,357,309	$3,814,977	50%/50%	$1,907,488	$34,540	$151,420	$ 2,058,909	$ (64,040)	$ 1,236,545

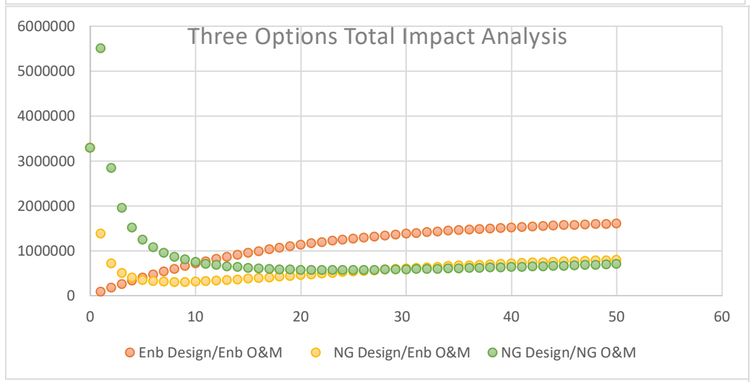
	After Rebuild to NG Design with NG O&M											After Rebuild to NG Design with NG O&M				
	Probability of Overheating Failure	Probability of Station Fail Open	Impact	Overpressure Risk	Probability of Underheating Failure	Probability of Station Fail Closed	Impact	Outage Risk	Total Baseline Risk	Estimated NG Detection and Response Failure % (Considers Response Distance and Troubleshooting Station/Heater	Estimated Risk	Annual Cost Excluding Enbridge Rates & Depreciation- NG design/Enb O&M	NG Design Cost Difference ISR Annualized Replacement Cost	Asset Impact (Risk+Annualized Replacement Cost	Average Annual Cost Differential to Full ISR	Annual Risk Differential to Full ISR
Year 1	0.000%	0.000%	$49,000	$0	0.0%	0.1%	$780,000	$504	$504	50%/25%	$253	$98,580	$5,076,870	$ 5,077,123	$ -	$ -
Year 10	0.01%	0.09%	$49,000	$50	0.9%	6.5%	$780,000	$57,805	$57,855	50%/25%	$30,155	$98,580	$662,416	$ 692,572	$ -	$ -
Year 20	0.07%	0.78%	$49,000	$416	2.5%	25.8%	$780,000	$220,428	$220,844	50%/25%	$120,621	$98,580	$445,116	$ 565,737	$ -	$ -
Year 30	0.22%	2.52%	$49,000	$1,344	4.0%	55.0%	$780,000	$460,357	$461,701	50%/25%	$263,771	$98,580	$398,799	$ 662,570	$ -	$ -
Year 40	0.48%	5.53%	$49,000	$2,948	5.3%	91.3%	$780,000	$753,226	$756,174	50%/25%	$450,325	$98,580	$401,965	$ 852,290	$ -	$ -
Year 50	0.84%	9.86%	$49,000	$5,244	6.2%	132.2%	$780,000	$1,079,687	$1,084,931	50%/25%	$670,943	$98,580	$432,165	$ 1,103,109	$ -	$ -

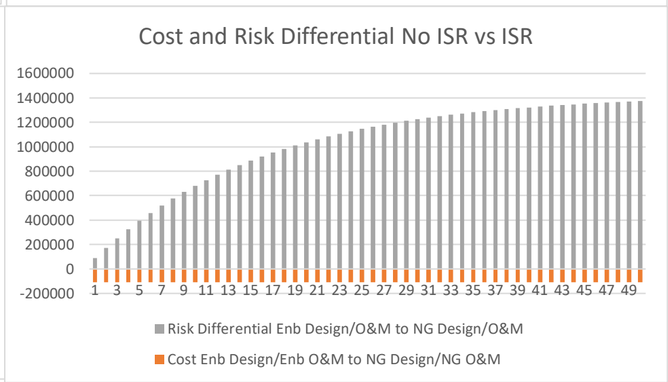
Wampanoag Trail Heater Replacement

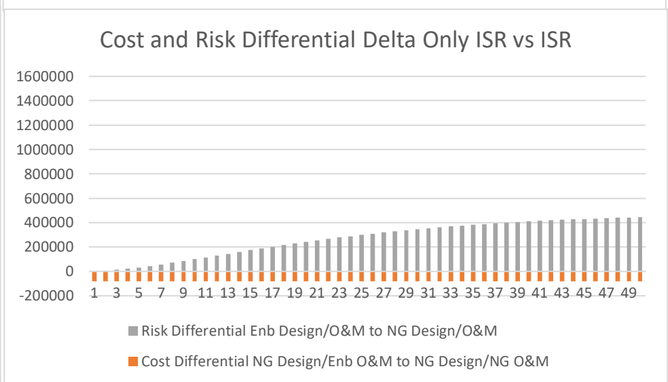




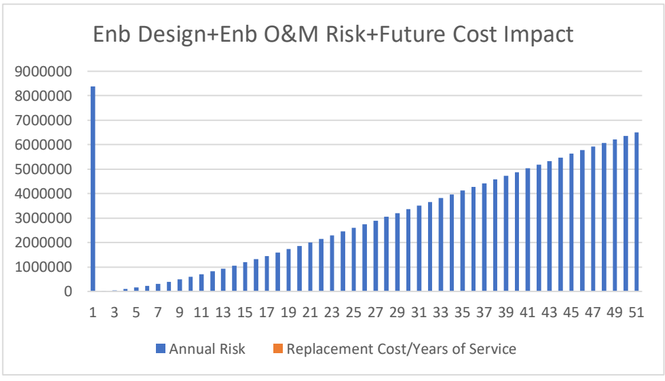


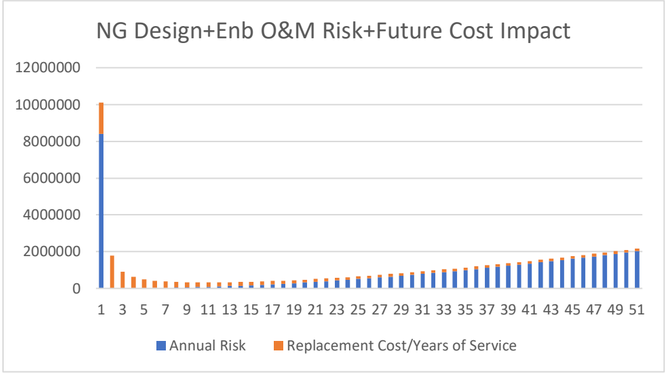


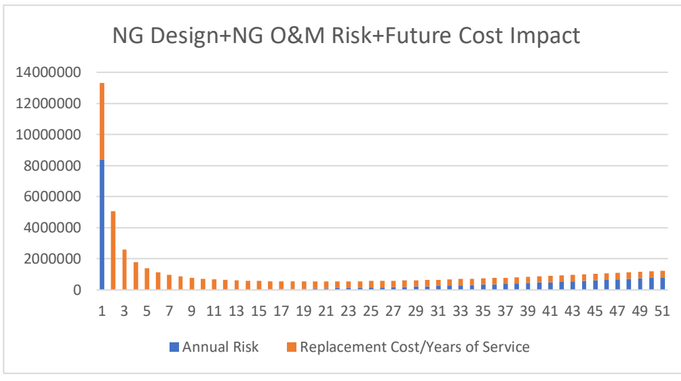


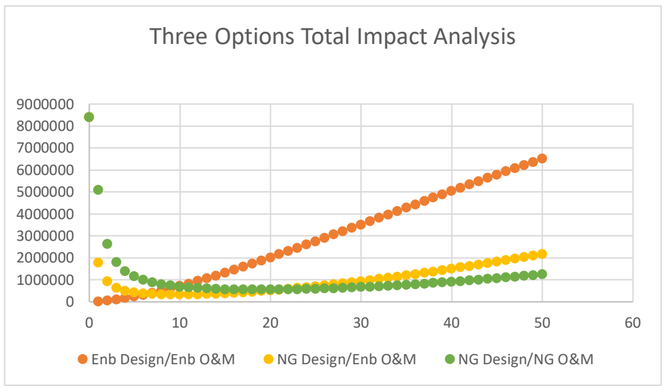


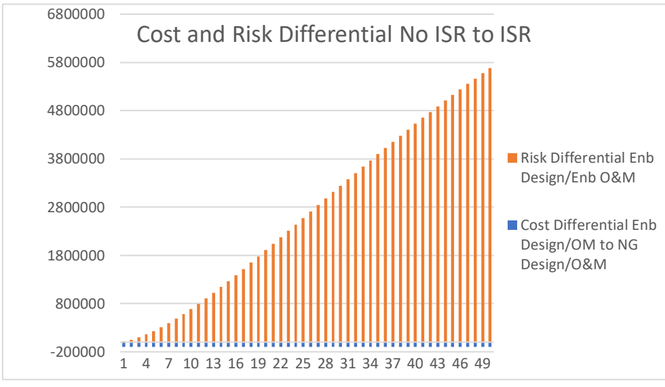
Tiverton Heater and Regulation Replacement

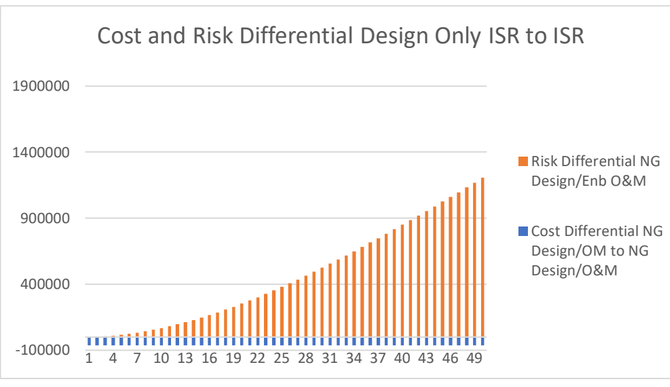












Record Request No. 13

Request:

How many more customers does the Company expect to connect above the 1600 customer connections referred to in PUC 2-22 with the Southern Rhode Island expansion project?

Response:

In the Company's response to PUC 2-22, the Company reported that there are currently 1,599 active customers that have been connected to the gas system since April 1, 2019 in Coventry, Cranston, East Greenwich, Exeter, Kingston, Narragansett, North Kingstown, Richmond, Scituate, South Kingstown, Warwick, West Greenwich, West Kingston, and West Warwick, which were enabled by the Southern RI Gas Expansion Project. This dataset included the date range of 4/1/19 through 1/31/22. In re-running the query for this record request, it was discovered that the count of customers connected to the gas system during this period should be corrected to 1,863.

From February 2, 2022 through March 15, 2022, another 17 customers have been connected to the gas system in those southern RI towns bringing the total through March 15, 2022 to 1,880.

The Southern Rhode Island expansion project has enough remaining capacity to connect the equivalent of approximately 10,000 additional residential heating customers forecasted in the southern RI towns through January 2027.

A summary table is included below: [1]

	Count of Billing Accounts by Open Date						Grand
	2017*	2018*	2019	2020	2021	2022	Total
Row Labels							
Gas 1012 Res Non Heat		1	16	54	34	2	107
Gas 1101 Res Low Inc Non Heat			1	2			3
Gas 1247 Res Heat	2	7	255	449	631	115	1,459
Gas 1301 Res Low Inc Heat		1	10	14	10		35
Gas 2107 C&I Small		4	65	82	73	17	241
Gas 2221 C&I Medium FT2					1		1
Gas 2237 C&I Medium			8	8	8	1	25
Gas 2321 C&I Large High Load FT2			1				1
Gas 2367 C&I Large High Load			1				1
Gas 3367 C&I Large Low Load				3	2		5
Gas 3496 C&I Extra Large Low Load			1				1
Gas Company Use			1				1
Grand Total	**2**	**13**	**359**	**612**	**759**	**135**	**1,880**

[1] Please note that the 15 billing accounts that were established in 2017 and 2018 did not begin using gas until after April 4, 2019

Prepared by or under the supervision of: Matthew Foran

Record Request No. 14

Request:

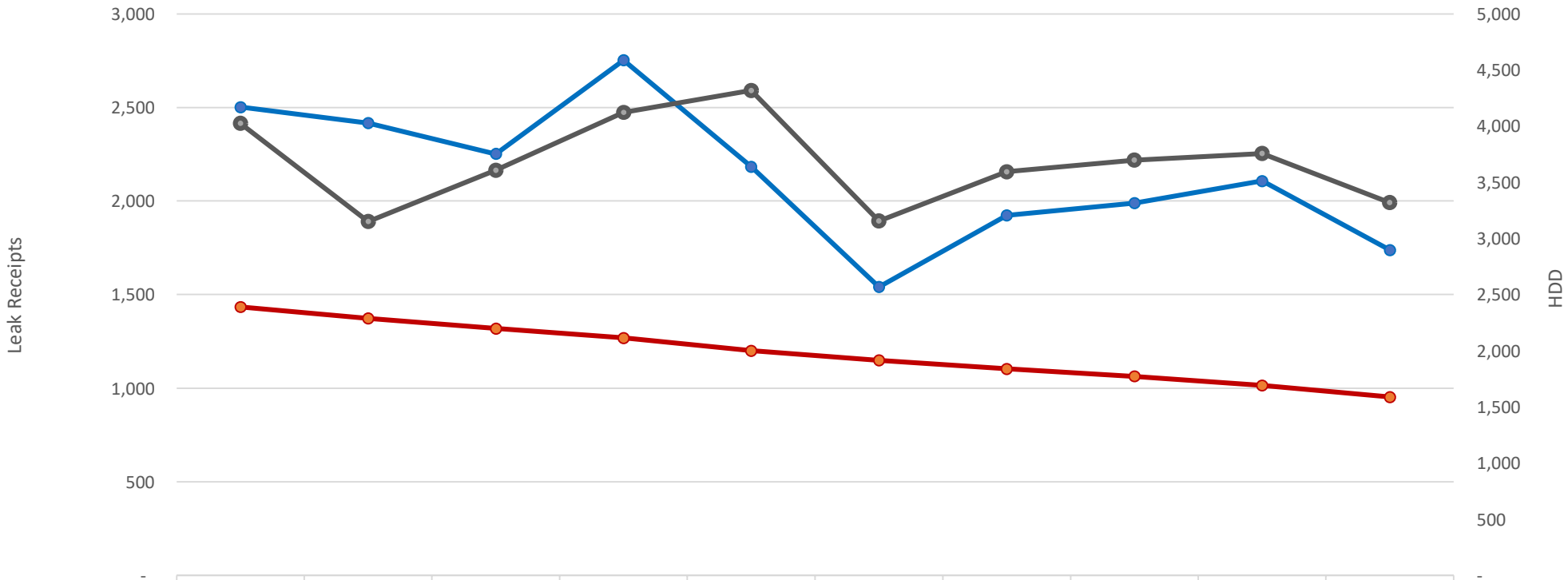
Provide, from 2011 through the most recent data available, and showing the plotted data in a table:

a. A graph of leak receipts per miles of LPP main inventory;
b. A graph of leak receipts per miles of LPP main and services inventory;
c. A graph of main leak repairs per miles of LPP main inventory;
d. A graph of service leak repairs per miles of LPP services inventory;
e. A graph with a line for each LPP material showing the number or repairs on that material type per mile of that material type inventory (we expect this excludes most plastic inventory; please also adjust scales if plotting the results on a single axis renders the variance of some data indistinguishable from zero).

Response:

Please refer to Attachment RR-14 for the information requested in this record request.

a) Leak Receipts per Miles of LPP Main Inventory
(Excluding Damages)



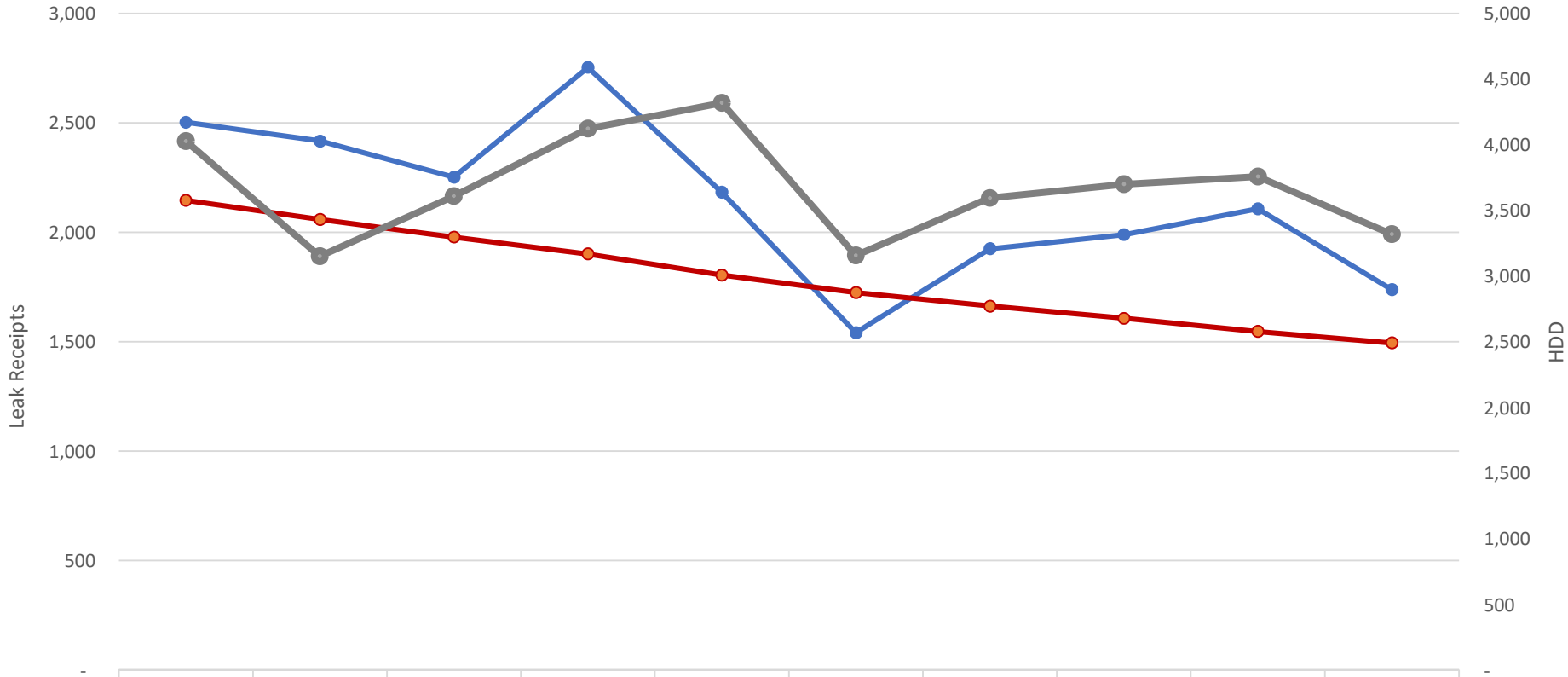
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Leak Receipts	2,502	2,417	2,252	2,753	2,183	1,541	1,924	1,989	2,107	1,738
*LPP Main (miles)	1,434	1,372	1,318	1,268	1,200	1,149	1,103	1,063	1,015	952
HDD	4,026	3,151	3,608	4,123	4,318	3,156	3,593	3,699	3,757	3,319

Calenadar Year

*Excludes Large Diameter CI (>12")

b) Leak Receipts per Miles of LPP Main and Services Inventory

(Excluding Damages)



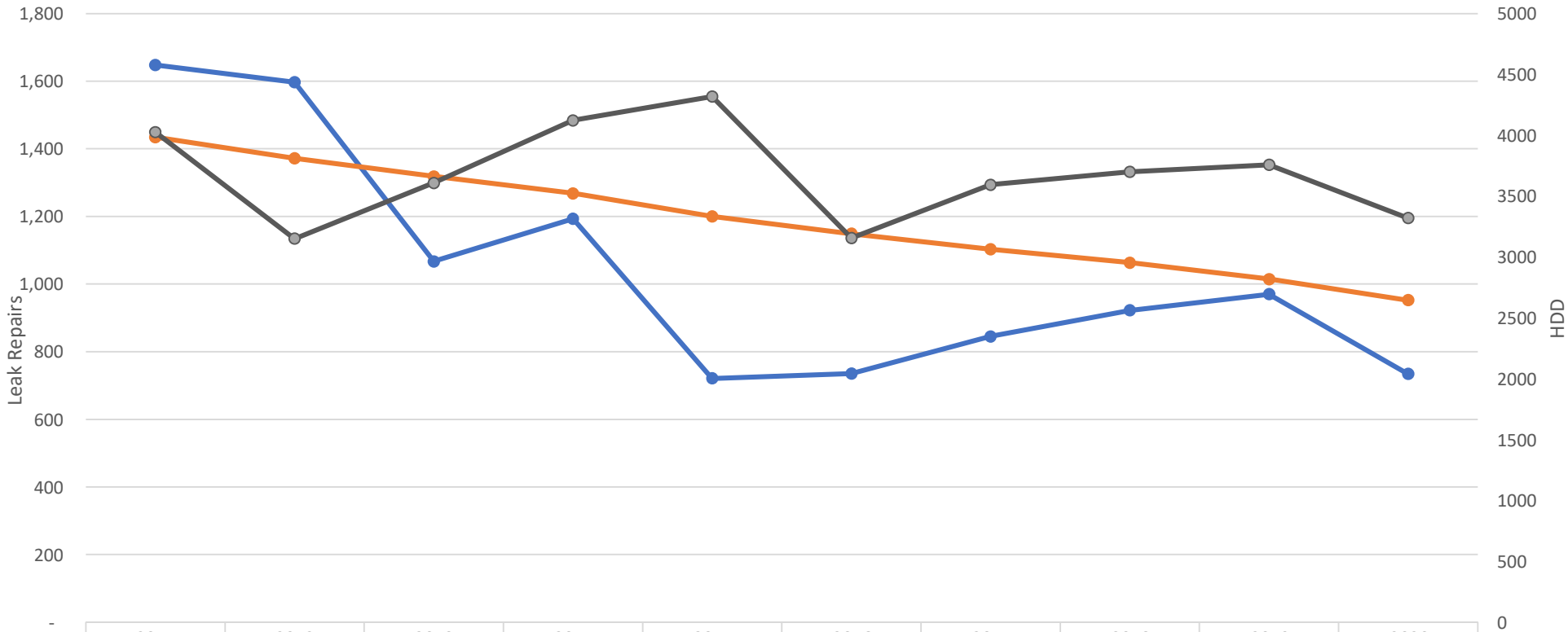
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Leak Receipts	2,502	2,417	2,252	2,753	2,183	1,541	1,924	1,989	2,107	1,738
*LPP Mains & Services (miles)	2,146	2,059	1,978	1,901	1,804	1,724	1,662	1,607	1,546	1,494
HDD	4,026	3,151	3,608	4,123	4,318	3,156	3,593	3,699	3,757	3,319

Calendar Year

*Excludes Large Diameter CI (>12")

c) Main leak repairs per miles of LPP main inventory

(Excluding Damages)



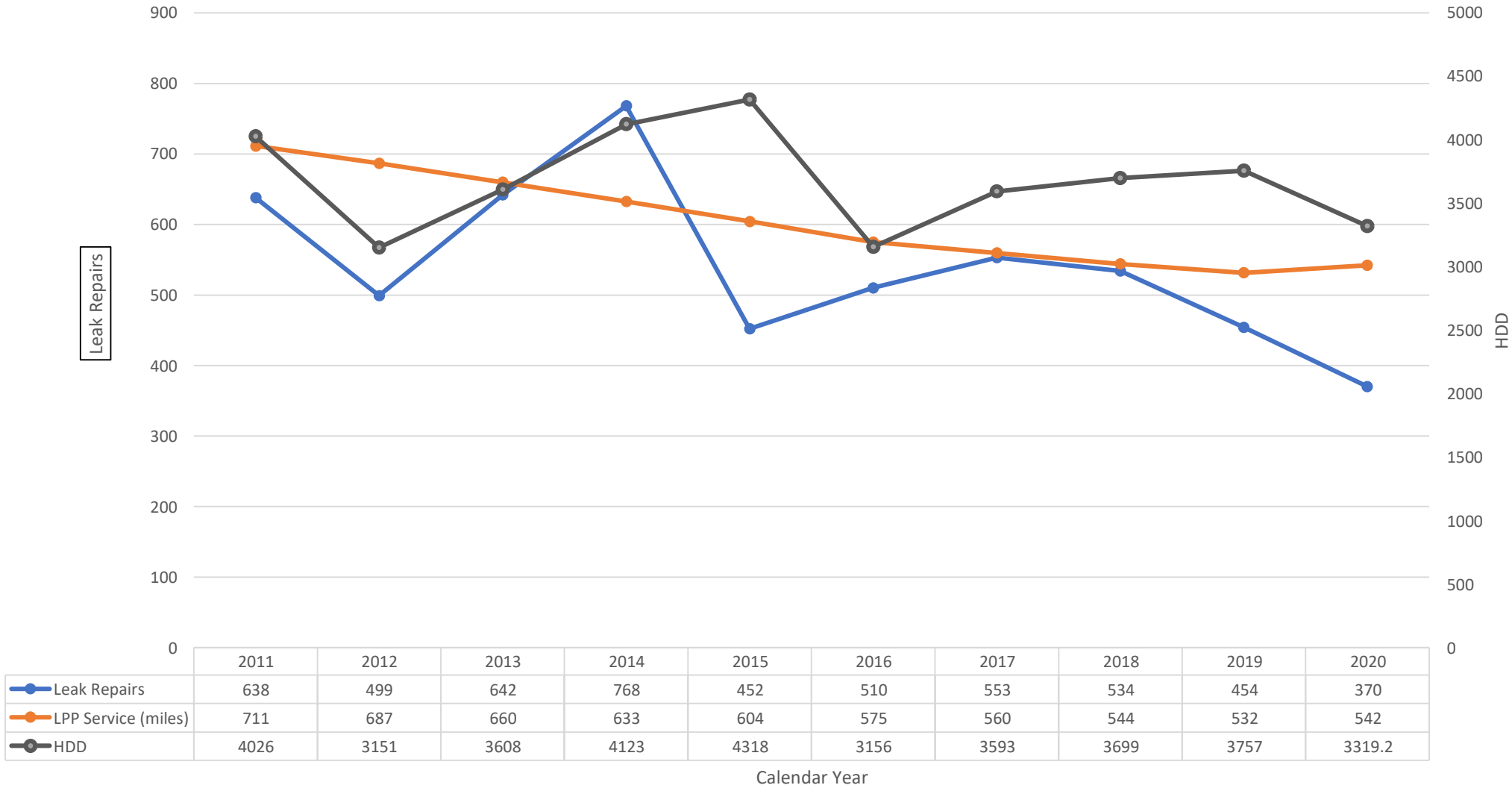
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Leak Repairs	1,648	1,597	1,067	1,193	721	735	845	922	970	734
*LPP Main (miles)	1,434	1,372	1,318	1,268	1,200	1,149	1,103	1,063	1,015	952
HDD	4026	3151	3608	4123	4318	3156	3593	3699	3757	3319

Calendar Year

*Excludes Large Diameter CI (>12")

d) Service Leak Repairs per Miles of LPP Services Inventory

(Excluding Damages)



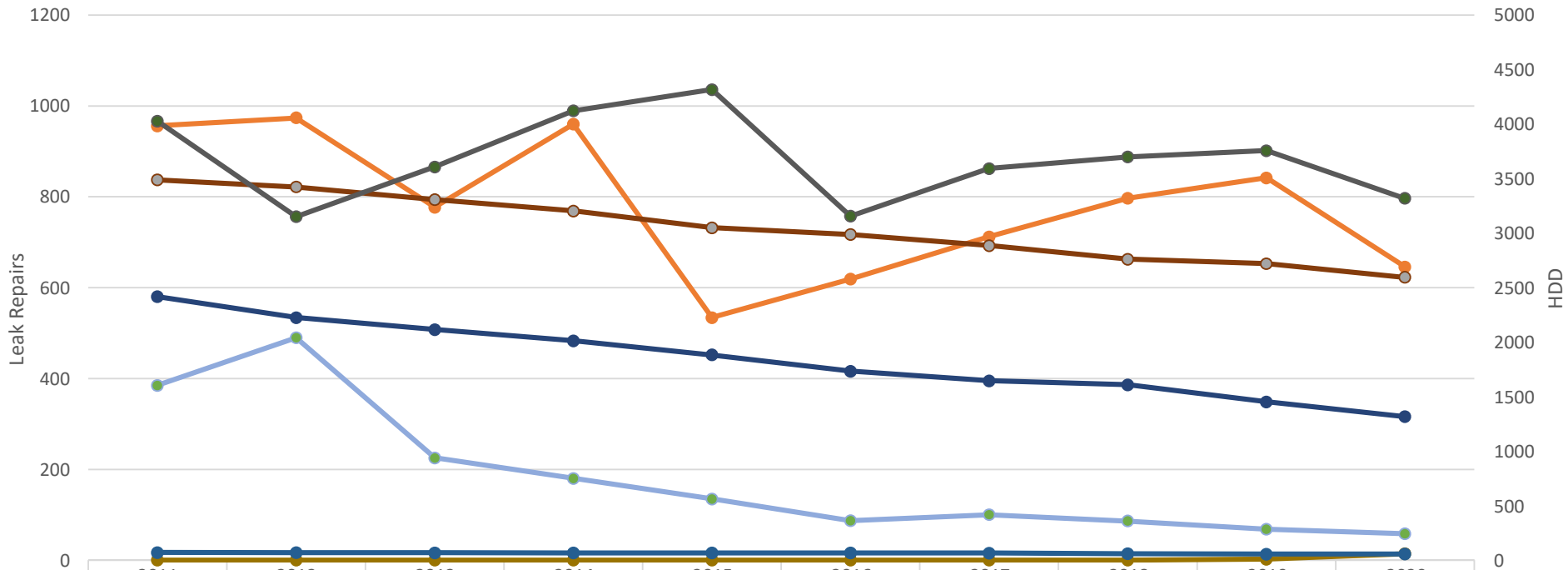
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Leak Repairs	638	499	642	768	452	510	553	534	454	370
LPP Service (miles)	711	687	660	633	604	575	560	544	532	542
HDD	4026	3151	3608	4123	4318	3156	3593	3699	3757	3319.2

Calendar Year

*Excludes Large Diameter CI (>12")

e) Miles of LPP Material per Number of Repairs

(Excluding Damages)



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cast Iron (leaks)	956	974	777	960	534	619	712	797	842	646
Cast Iron (miles)	838	822	794	769	732	717	693	663	653	623
Steel - Unprotected (leaks)	385	490	225	180	135	87	100	86	68	58
Steel - Unprotected (miles)	580	534	508	483	452	416	395	386	349	316
Ductile Iron (leaks)	0	0	0	0	0	0	0	0	2	14
Ductile Iron (miles)	17	16	16	16	16	16	16	14	13	13
HDD	4026	3151	3608	4123	4318	3156	3593	3699	3757	3319.2

Calendar Year

*Excludes Large Diameter CI (>12")

Record Request No. 15

Request:

Please explain the difference in forecasted replacement miles between what is presented on Bates 134 and what is presented in response to PUC 3-14. Please confirm that the data in 3-14 is the result of the increasing budget forecast for Proactive Main Replacement on Bate 70.

Response:

The replacement miles on Bates 134 includes the forecast replacement miles for all programs (leak prone pipe, Public Works, Reinforcement, Reliability, Others). In the response to PUC 3-14, the Company included the proactive leak prone pipe replacement miles (Work Plan), the reduction of leak prone pipe based on replacement schedule (Inventory) and the ISR Budget Forecast (ISR Forecast).

The increase in the leak prone pipe budget from FY23 to FY24 is primarily due to the increase in planned installation miles. Another factor contributing to the increase is that the percentage of cast iron replacement is increasing from 70% in the FY23 plan to 80% in the FY24 plan. The increase in budget from FY24 onward is driven by standard inflationary factors as planned installation miles should remain relatively consistent.

Record Request No. 16

Request:

Please revise the response to PUC 3-23 so that the table in Attachment 3-23 includes a row for the unaccounted for gas included in rates for the years presented pursuant to RIPUC NG-GAS No. 101 and a row for the value of this volume in rates based on the rates charged during the rate period. If the calculation of unaccounted for gas for the purposes of the tariff is different than the calculation provided in 2-22, please briefly explain that difference.

Response:

Please see Attachment RR-16 for the value of unaccounted for gas ("UFG") included in Gas Cost Recovery ("GCR") rates charged during the rate period. Pursuant to R.I.P.U.C. NG-GAS No. 101, UFG is derived by the annual difference between the forecasted Sendout (volumes of gas purchased) and forecasted throughput (volumes of gas sold to sales customers) for the GCR rate period of November through October.

The calculation of unaccounted for gas for the purpose of the tariff is different that the calculation provided in the response to PUC 3-23. Please refer to Attachment RR-16 for a comparison of the calculations that illustrates these differences.

Attachment RR-16

The Narragansett Electric Company
Calculation of the Value of Unaccounted for Gas included in GCR Rates
vs.
Calculation of the value of Unaccounted for Gas included in the Department Of Transportaion (DOT) Annual Filling

		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Tariff	(1) *Unaccounted for Gas (DT)	8,921,726	4,225,560	1,967,220	-1,498,917	2,947,103	9,524,484	7,475,568	7,242,861	27,775,189	6,219,074	14,616,726
	(2) GCR Rate	$ 0.9078	$ 0.7877	$ 0.6689	$ 0.7449	$ 0.6864	$ 0.5518	$ 0.4756	$ 0.6353	$ 0.7018	$ 0.5285	$ 0.5547
	(3) Value of UFG	**$ 8,099,577**	**$ 3,328,651**	**$ 1,315,887**	**$ -**	**$ 2,022,769**	**$ 5,255,737**	**$ 3,555,271**	**$ 4,601,512**	**$ 19,493,607**	**$ 3,286,893**	**$ 8,108,239**
		(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(w)
DOT Report	(4) **Net UFG (MDT)	1086	822	1,346	1,573	1,395	690	915	1,088	1,147	1,213	1141
	(5) Net UFG (DT)	1,085,944	821,628	1,345,823	1,572,545	1,394,870	690,128	915,358	1,088,132	1,146,872	1,213,450	1,140,658
	(6) Net UFG (MCF)	1,058,425	800,807	1,311,718	1,532,695	1,359,523	672,640	892,162	1,060,557	1,117,809	1,182,700	1,111,752
	(7) Metric Ton of CO2 Equivalent	58,001.70	43,884.22	71,882.15	83,991.69	74,501.85	36,860.65	48,890.48	58,118.55	61,255.94	64,811.96	

Notes:

Tariff	(1) Calculated from Company Annual GCR Filings as the difference between forecasted Sendout (purchased gas volumes) and forecasted throughput (gas delivered to sales customers) (2) Weighted average effective Gas Cost Recovery Factor during the respective GCR year based on approved High Load and Low Load GCR Factors and any changes to the factors during the GCR year. (3) Line (1) x Line (2) d) Sendout forecast was slightly lower than throughput forecast resulting in no UFG included in GCR factors ** UFG for the GCR rate period of November through October*
DOT Report	(4) Net UFG is derived by subtracting system leakage from the Gross UFG (Gross UFG = Purchase gas volumes - Gas delivered to customers) in MDT (5) Included for comparisson and not included in the original table. This values represents the conversion of Net UFG from MDT to DT (DT = MDT*1000) (6) This value is derived from the conversion of Net UFG from DT to MCF (Net UFG (MCF) = Net UFG (DT)/1.026 MCF/DT) (7) This value is derived by multiplying the Net UFG (MCF)*0.0548 metric ton of CO2/MCF *** UFG for the DOT reporting is calculated based on the gas purchase and gas sold during the period of July through June*