**1.** Please provide a written narrative summarizing overall meter testing program results with observations related to year over year average cost per meter test variances by class.

**Response:** The year over year average cost per meter variance by class for years 2015, 2016, 2017 and 2018 are illustrated below. The data shows that the average cost per meter test did not vary significantly year-over-year. The cost per test has direct correlation to the quantity of meters that are shipped per shipment.

Class A - Small Diaphragm 0 - 500 CFH

Test Year	Meter Tests	Total Expense	Cost per Meter
2018	2506	\$ 30,244.65	\$ 12.07
2017	2348	\$ 28,435.84	\$ 12.11
2016	2876	\$ 31,902.37	\$ 11.09
2015	2993	\$ 35,767.69	\$ 11.95
Average	2681	\$ 31,587.64	\$ 11.80

Class B – Large Diaphragm > 500 CFH

Test Year	Meter Tests	Total Expense					st per Ieter
2018	144	\$	8,531.27	\$	59.24		
2017	146	\$	8,752.44	\$	59.95		
2016	140	\$	8,118.67	\$	57.99		
2015	158	\$	9,174.01	\$	58.06		
Average	147	\$	8,644.10	\$	58.81		

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#### **Rotary**

Test Year	Meter Tests	Total Expense	Cost per Meter
2018	268	\$ 19,207.64	\$ 71.67
2017	339	\$ 24,473.67	\$ 72.19
2016	346	\$ 24,350.33	\$ 70.38
2015	328	\$ 21,119.23	\$ 70.63
Average	320	\$ 22,287.72	\$ 71.22

**2.** Please provide a reconciliation of actual outsourced gas meter testing program costs to identified costs in its third-party vendor's purchase order agreement(s).

Response: Please see Attachment 1 - Gas Testing Invoice Reconciliation 2018.

**3.** Please provide a cost benefit analysis that compares sufficiently detailed actual costs of outsourcing meter testing for each of Unitil's three gas divisions to updated cost estimates to bring the meter testing and servicing operation in-house.

**Response:** Please see Attachment 2 Unitil - Gas Testing Facility Cost Analysis 2018.

**4.** For any group of meters that have been flagged with accuracy rates of 87% or less, please provide an updated status of what steps have been taken by Northern or its meter testing program vendor, to determine the defect responsible.

**Response:** Annual tests did not flag any groups of meters as having accuracy rates of 87% or less.

**5.** Please provide a detailed analysis and explanation of what is causing higher occurrence of accuracy issues of rotary meters being used by Northern.

**Response:** The Company's analysis indicates that both LMMA and Series B3 TC indexes have had failed accuracy meter tests. The failures are not specific to a particular year of manufacture, but are spread throughout the years of manufacture that was tested which is 1985 to 2009. These failures aren't specific to a particular size of meter but include meters from sizes 15C to 16M.

Prior to visiting the testing facility, the Company had conversations with the meter manufacture's testing team to review the manufacture's recommended procedures and also reviewing the testing vendor's rotary meter testing procedures. As recommended by the manufacturer, the testing vendor is performing tests on both the body, to confirm that volume is being measured accurately and the

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temperature compensating index is accurately compensating for gas temperature. The feedback from the manufacturer was that the testing vendor's written test procedures were in line with industry standard.

At that time, the Company also discussed our current practices of handling our rotary meters with the meter manufacturer. They reiterated the need to drain the oil from the meter body before any transportation to avoid splashing the oil into the meter body. The meter manufacturer also emphasized the need to ensure meter caps are placed on the meters to prevent any debris to enter the body/impellers of the meter. They also recommend that all rotary meters are shipped in specific rotary meter boxes.

The Company followed up with field gas supervisors to reiterate the importance of following the manufacture's suggestion to drain oil from the meter body after the pressure has been released from the meter, but before the meter is removed from the meter fit. The Company also emphasized with the supervisors the importance of properly handling the meters once they have been removed, which involves installing caps in the inlet and outlet orifices and placing the meters in a special rotary meter box for shipping. This is to reduce the chances of foreign material from entering into the impeller chamber.

The Company had representatives from the manufacturer meet us at the testing facility so that we both could observe the meter testing vendor's testing practices. While on site, we observed the process from the time the meter was received by the testing vendor through to when the meter is ready to be returned to Northern. We observed meters being tested on the prover, which is calibrated every 3 years. As a note, the temperature within the testing facility is maintained at 68 degrees +/- 1.5 degrees.

During the set-up for testing, the representative from the manufacturer emphasized the importance of properly setting up the optical probe of the prover so that it accurately captures correct counts from the test dial which is actual volume measurement through the meter. We noticed that the optical probe was connected to a pipe structure that was holding up a large fan. When the fan turned on, it shook the pipe that the optical probe was mounted on and might cause an inaccurate test result.

The manufacturer representative recommended that each rotary meter be connected to the prover and air be allowed to flow through it for a couple minutes prior to performing the actual meter test. The reason for this is to ensure the mechanical test dial is in sync with the mechanics of the meter and avoid any sticky or jumpy test dial counts, which can affect the result of the meter test.

The manufacturer representative noticed that the testing company had a hose hanging down from the ceiling that is sometimes placed on top of the meter to control the noise level when some rotary meters are tested. The manufacturer representative recommended that the testing company stop the practice of placing the hose on top of the meter as it may affect the accuracy of the meter test. We recommended to the testing company to stop that practice when testing Unitil meters.

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The manufacturer representative also suggested that the testing technician ensure that the mechanical temperature dial on temperature compensated indexes be properly tightened before testing. This test dial is used by the prover for counting gas flow through the meter, and if it is loose or wobbly counts can be added or omitted during testing which may cause meter to fail the accuracy test. The dial itself can be tightened to stop the wobbling before testing. This problem was more common on LMMA oil filled indexes; however, it needs to be verified on all rotary meters.

The manufacturer representative also stated that dirty or blurry plastic index covers can cause errors with the optical probe of the prover. It is important to make sure that the optical pickup probe is at the proper angle to be 100% sure the probe is capturing the correct pulses from the test dial.

The manufacturer representative recommended that all Series B3 index temperature probes that are +/- 4 degrees as compared to actual temperature of the testing facility testing room temperature are replaced with new probes as these units cannot be adjusted.

During our observations, one of the Series B3 rotary meters tested outside the 98-102% range, so the testing technician then performed a 25 count test. This is a more involved meter test that is recommended by the manufacturer to determine if the issue is due to the body of the rotary meter or due to the index. In this case, it was determined that the temperature probe had some corrosion and was the cause of the accuracy issue. Unitil has noticed some with corroded or discolored temperature probes. The result was an inaccurate temperature dial reading as compared to actual testing room temperatures.

The meter manufacturer informed us with respect to temperature probes, that a design change was introduced in 2010. At the time, the manufacturer send a memo to customers informing them that the new design was implemented to improve their supply chain with a stable provider, and that the change would not affect meter accuracy or performance. In the memo, the manufacturer stated that this new provider has a core competency in bimetal thermometers.

As a result of our observations during the site visit, we collaborated with the manufacture and the testing vendor to strengthen the rotary testing procedures. The updated procedures include the following:

- Any rotary meter with oil in the body will be flushed prior to testing.
- Performing a 25 count test on any meter that has test results that fall outside of the +/- 2% tolerance.
- Notification from the testing vendor if there are any issues with packaging or shipping from our Unitil divisions.
- Recording of the temperature probe's actual temperature dial readings to identify temperature probe issues.
- Temperature probe dials that are +- 4 degrees against testing room temperature are to be replaced.

- Any Series B3 temperature probe manufactured prior to 2011 to be replaced.
- Air flow period prior to testing to endure proper meter test dial operation.
- Ensure hose is not placed on top of rotary meter during testing.
- Prover optics not installed on shaky fan pipe.
- Improvements on recording of the specific cause of any test result outside the acceptable 2% tolerance.
- Meters tested outside of 5% tolerance will be reviewed by a supervisor before test is accepted and supplied to Unitil.

In summary, the Company consulted with the manufacture's testing team and reviewed the procedures followed by Unitil and the testing vendor. We identified areas for improvement for both groups and collaborated on updated procedures for the way we prepare and handle meters for shipping to the testing facility and the testing vendor's testing procedures. The results for 2018 have improved considerably, so the changes appear to be having a positive impact. We will continue to monitor processes and testing results to see if the improvement in accuracy continues or if it is an anomaly.

**6.** Please provide an explanation of how Unitil Service's other affiliated gas divisions seem to be insulated from accuracy problems for rotary meters.

**Response:** The other affiliated gas companies are not subject to the same reporting requirement, and do not employ the reporting mechanisms that are used in New Hampshire. Accordingly, this type of data is not readily available, and there has been no determination that the other affiliated gas divisions are insulated from this issue.

**7.** Please provide when the accuracy of rotary meters first became an issue.

**Response:** Data indicates that rotary meter test results started to appear lower in 2014 when U&I became the Company's testing vendor.

**8.** Please describe what steps Northern and its vendor have taken to resolve accuracy problems with rotary meters.

**Response:** Please see the response to No. 5, above.

**Customer Orders** 1995 Industrial Blvd Reynoldsville, PA 15851-0190 Phone: (814) 653-8269 or 653-8411

Fax: (814) 653-7306

Please Remit Payment To: Invoice Number:

**UTILITIES & INDUSTRIES** 

c/o DBI Inc.

660 Longview Rd, Suite 2 Fairmount City, PA 16224

28581

Invoice Date:

02/28/18

Page: 1

Freight is F.O.B. Plant.

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A service charge of 1.5% per month will be added to any unpaid balance of 30 days or more.

NORTHERN UTILITIES NH/ME **6 LIBERTY LANE WEST** HAMPTON, NH 03842-1720 L knowles@unitil.com

ATTN: STEVEN HAMBLEN

S NORTHERN UTILITIES NH

325 WEST ROAD

PORTSMOUTH, NH 03801

deschambeault@unitil.com

ATTN: STEVEN HAMBLEN

Sales Ord No: Order Date: Account Cd:

Salesperson:

25788 02/28/18

**UNITIL PL** 0

Taxable: Pmt Terms: NET 15

Shipper No:0 Ship Date: 02/28/18 Purchase Order: NNH70752 Ship Via:

**UI TRUCK** 

FOB:

**PLANT** 

Line	Qty Shipped	Backordered	Part Number/Description	Discount	Price	UM	Extended Price
	41	0	CLASS J REP DOM UNITIL INTEST/CONDEMN	0.00 DOM	\$10.0100	EA	\$410.41
	3	0	CLASS J REP 400 UNITIL INTEST/CONDEMN	0.00	\$10.0100	EA	\$30.03
	2	0	INTEST DOM SPECIAL TEST DOMESTIC	0.00 METER	\$28.5600	EA	\$57.12
	3	0	REPAIR CLASS A AMERICAN/ROCKWELL DO	0.00 OM METERS	\$22.9500	EA	\$68.85
	20	0	REPAIR CLASS B AMERICAN/ROCKWELL DO	0.00 OM METER	\$35.6000	EA	\$712.00
	1	0	REPAIR CLASS C AMERICAN/ROCKWELL DO	0.00 OM METER	\$40.9100	EA	\$40.91
	1	0	EXTRA PARTS DOM DOMESTIC EXTRTA PART	0.00	\$248.8800	EA	\$248.88
	5	0	REPAIR CLASS B 400 CLASS METERS	0.00	\$36.5500	EA	\$182.75
	1	0	EXTRA PARTS DOM EXTRA PARTS 400 CLASS	0.00 METERS	\$49.8100	EA	\$49.81
	2	0	CLASS A REPAIR AL800/1000 LC METER	0.00	\$77.1800	EA	\$154.36
	2	0	CLASS B REPAIR AL800/1000 LC METER	0.00	\$157.3500	EA	\$314.70
	1	0	EXTRA PARTS LC LARGE CAPACITY EXTRA	0.00 PARTS	\$418.1600	EA	\$418.16
	2	0	ROTARY REPAIR B	0.00	\$274.3600	EA	\$548.72

**Customer Orders** 1995 Industrial Blvd Reynoldsville, PA 15851-0190 Phone: (814) 653-8269 or 653-8411

c/o DBI Inc. 660 Longview Rd, Suite 2 Fax: (814) 653-7306 Fairmount City, PA 16224

Please Remit Payment To: Invoice Number:

**UTILITIES & INDUSTRIES** 

Invoice Date:

28581

02/28/18

Page:

2

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NORTHERN UTILITIES NH/ME **6 LIBERTY LANE WEST** HAMPTON, NH 03842-1720 knowles@unitil.com

ATTN: STEVEN HAMBLEN

S NORTHERN UTILITIES NH

325 WEST ROAD

PORTSMOUTH, NH 03801

deschambeault@unitil.com

ATTN: STEVEN HAMBLEN

Sales Ord No: Order Date: Account Cd:

Salesperson:

25788 02/28/18

**UNITIL PL** 

0

Taxable: Pmt Terms: NET 15

Shipper No:0

Ship Date: 02/28/18

Purchase Order: NNH70752 **UI TRUCK** 

Ship Via: FOB:

PLANT

Job Number:

Line	Qty Shipped	Backordered	Part Number/Description	Discount	Price	UM	Extended Price
	28	0	3M -5M ROTARY METER DDM INSTALL BADGES	0.00	\$2.9500	EA	\$82.60
	35	0	DDM INSTALL ERTS	0.00	\$5.2000	EA	\$182.00
	1	0	DELVCHG-PU UNITIL PICKUP CHARGES	0.00	\$404.6700	EA	\$404.67
	1	0	DELVCHG-DEL UNITIL DELIVERY CHARGE	0.00 ES	\$404.6700	EA	\$404.67

Return Policy: 30 days: No charge for manufacturers defect, otherwise 30% restock fee. Special Orders: NO Returns unless defective.

Subtotal:

\$4,310.64

Freight:

\$0.00

Total:

\$4,310.64

	Invoice Reconciliat	ion			
Description of Test/Repair	Size of Meter	Cost	per Test	Quantity	Total
Class A Repair	Domestic	\$	22.95	3	\$ 68.85
Class A Repair	Class 400	\$	22.56		\$ -
Class A Repair	Class 700	\$	79.91		\$ -
Class A Repair	Class 800/1000	\$	77.18	2	\$154.36
Class A Repair	Rotary (all sizes)	\$	73.44		\$ -
Class B Repair	Domestic	\$	35.60	20	\$712.00
Class B Repair	Class 400	\$	36.55	5	\$182.75
Class B Repair	Class 700	\$	158.60		\$ -
Class B Repair	Class 800/1000	\$	157.35	2	\$314.70
Class B Repair	Rotary 1.5M	\$	274.36		\$ -
Class B Repair	Rotary 3M - 5M	\$	274.36	2	\$548.72
Class B Repair	Rotary 7M	\$	243.92		\$ -
Class B Repair	Rotary 11M	\$	243.92		\$ -
Class B Repair	Rotary 16M	\$	274.36		\$ -
Class B Repair	Rotary 23M	\$	334.52		\$ -
Class C Repair	Domestic	\$	40.91	1	\$ 40.91
Class C Repair	Class 400	\$	42.50		\$ -
Class C Repair	Class 700	\$	186.24		\$ ,-
Class C Repair	Class 800/1000	\$	193.51		\$ -
Class J Repair - Intest/Condemn	Domestic	\$	10.01	41	\$410.41
Class J Repair - Intest/Condemn	Class 400	\$	10.01	3	\$ 30.03
Class J Repair - Intest/Condemn	Class 700 - 1000	\$	58.61		\$ -
Class J Repair - Intest/Condemn	Class 1400	\$	66.29		\$ -
Class J Repair - Intest/Condemn	Class 2300	\$	71.73		\$ -
Class J Repair - Intest/Condemn	Class 5000	\$	78.53		\$ -
Class J Repair - Intest/Condemn	Rotary 1.5M - 7M	\$	71.26		\$ -
Class J Repair - Intest/Condemn	Rotary 11M	\$	73.98		\$ -
Class J Repair - Intest/Condemn	Rotary 16M	\$	76.69		\$ -
Class J Repair - Intest/Condemn	Rotary 23M	\$	82.14		\$ -
Special Test Domestic Meter		\$	28.56	2	\$ 57.12
Special Test Large Capacity Meter		\$	53.72		\$ -
Special Test Rotary Meter		\$	47.94		\$ -

Install New Meter Badges	All Diaphragm Sizes	\$ 2.95	28	\$ 82.60
Install New Badger/Itron Endpoints	All Diaphragm Sizes	\$ 5.20	35	\$182.00
New Diaphragm Meter Parts	All Diaphragm Sizes	\$ 716.85	N/A	\$716.85
New Rotary Meter Parts	All Rotary Sizes		N/A	\$ -
Special Test Shipping	All		N/A	\$ -
DELVCHG - PU	Total Shipment	\$ 404.67	N/A	\$404.67
DELVCHG - DEL	Total Shipment	\$ 404.67	N/A	\$404.67
Invoice #	28581		Total	\$4,310.64
Invoice Date	2/28/2018			

**Customer Orders** 1995 Industrial Blvd Reynoldsville, PA 15851-0190 Phone: (814) 653-8269 or 653-8411

Fax: (814) 653-7306

Please Remit Payment To: Invoice Number:

**UTILITIES & INDUSTRIES** 

c/o DBI Inc.

660 Longview Rd, Suite 2 Fairmount City, PA 16224

28937

Invoice Date: 06/06/18

> Page: 1

Freight is F.O.B. Plant.

All sales are subject to Net 30 Day payment terms.

A service charge of 1.5% per month will be added to any unpaid balance of 30 days or more.

**B** NORTHERN UTILITIES NH/ME **6 LIBERTY LANE WEST** HAMPTON, NH 03842-1720 L knowles@unitil.com

ATTN: STEVEN HAMBLEN

S NORTHERN UTILITIES NH

325 WEST ROAD

PORTSMOUTH, NH 03801

deschambeault@unitil.com

ATTN: STEVEN HAMBLEN

Sales Ord No: Order Date: Account Cd:

Salesperson:

26092 06/05/18

**UNITIL PL** 

Taxable: N Pmt Terms: NET 15 Shipper No:0

Ship Date: 06/06/18

Purchase Order: NNH 70752

**UI TRUCK** 

Ship Via: FOB:

PLANT

Line	Qty Shipped	Backordered	Part Number/Description	Discount	Price	UM	Extended Price
	23	0	CLASS J REP DOM	0.00	\$10.0100	EA	\$230.23
			UNITIL INTEST/CONDEMN	IDOM			
	2	0	CLASS J REP 400	0.00	\$10.0100	EA	\$20.02
			UNITIL INTEST/CONDEMN		AND CONTROLS AND A SECTION OF THE PROPERTY OF		
	1	0	CLASS J REP LC	0.00	\$58.6100	EA	\$58.61
	100		UNITIL INTEST/CON LC 70				
	3	0	CLASS J REP ROT	0.00	\$71.2600	EA	\$213.78
			UNITIL INTEST/CON ROT	1.5M-7M			
	1	0	INTEST DOM	0.00	\$28.5600	EA	\$28.56
			SPECIAL TEST DOMESTIC	METER			
	8	0	REPAIR CLASS A	0.00	\$22.9500	EA	\$183.60
			AMERICAN/ROCKWELL D	OM METERS			
	8	0	REPAIR CLASS B	0.00	\$35.6000	EA	\$284.80
			AMERICAN/ROCKWELL DO	OM METER			
	3	0	REPAIR CLASS C	0.00	\$40.9100	EA	\$122.73
			AMERICAN/ROCKWELL DO	OM METER			
	1	0	EXTRA PARTS DOM DOMESTIC EXTRTA PART	0.00 S	\$160.2800	EA	\$160.28
	2	0	REPAIR CLASS B	0.00	\$36.5500	ΕΛ	\$73.10
	2	U	400 CLASS METERS	0.00	\$30.5500	EA	\$73.10
	1	0	EXTRA PARTS DOM	0.00	\$13.1500	FΔ	\$13.15
	1	U	EXTRA PARTS 400 CLASS		φ13.1300		Ψ13.13
	4	0	CLASS B REPAIR	0.00	\$157.3500	EA	\$629.40
			AL800/1000 LC METER	- Was 1 F 2 2 P			
	1	0	EXTRA PARTS LC	0.00	\$292.7400	EA	\$292.74
			LARGE CAPACITY EXTRA	PARTS			

### INVOICE U & I UTILITIES & INDUSTRIES, INC.

**Customer Orders** 1995 Industrial Blvd Reynoldsville, PA 15851-0190 Phone: (814) 653-8269 or 653-8411

Fax: (814) 653-7306

Please Remit Payment To: Invoice Number:

**UTILITIES & INDUSTRIES** 

c/o DBI Inc.

660 Longview Rd, Suite 2 Fairmount City, PA 16224

28937

Invoice Date:

06/06/18

Page: 2

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NORTHERN UTILITIES NH/ME **6 LIBERTY LANE WEST** HAMPTON, NH 03842-1720 knowles@unitil.com

ATTN: STEVEN HAMBLEN

NORTHERN UTILITIES NH

325 WEST ROAD

H PORTSMOUTH, NH 03801

deschambeault@unitil.com

ATTN: STEVEN HAMBLEN

Sales Ord No: Order Date: Account Cd:

Salesperson:

26092 06/05/18

**UNITIL PL** 0

Taxable: N Pmt Terms: NET 15

Shipper No:0

Ship Date: 06/06/18

Purchase Order: NNH 70752

Ship Via:

**UI TRUCK PLANT** 

FOB:

Line	Qty Shipped	Backordered	Part Number/Description	Discount	Price	UM	Extended Price
	25	0	ROTARY REPAIR B 3M -5M ROTARY METER	0.00	\$274.3600	EA	\$6,859.00
	2	0	ROTARY REPAIR B	0.00	\$243.9200	EA	\$487.84
	1	0	7M ROTARY METER ROTARY REPAIR B 11M ROTARY METER	0.00	\$243.9200	EA	\$243.92
	1	0	ROTARY REPAIR B 16M ROTARY METER	0.00	\$274.3600	EA	\$274.36
	1	0	EXTRA PARTS ROT ROTARY METER EXTRA F	0.00 PARTS	\$724.4800	EA	\$724.48
	17	0	DDM INSTALL BADGES	0.00	\$2.9500	EA	\$50.15
	16	0	DDM INSTALL BADGES	0.00	\$2.9500	EA	\$47.20
	36	0	DDM INSTALL ERTS	0.00	\$5.2000	EA	\$187.20
	1	0	DELVCHG-PU UNITIL PICKUP CHARGES	0.00	\$403.0000	EA	\$403.00
	1	0	DELVCHG-DEL UNITIL DELIVERY CHARG	0.00 ES	\$403.0000	EA	\$403.00

**Customer Orders** 1995 Industrial Blvd Reynoldsville, PA 15851-0190 Phone: (814) 653-8269 or 653-8411

Fax: (814) 653-7306

Please Remit Payment To: Invoice Number:

**UTILITIES & INDUSTRIES** 

Invoice Date:

28937 06/06/18

c/o DBI Inc.

660 Longview Rd, Suite 2 Fairmount City, PA 16224 Page:

3

Freight is F.O.B. Plant.

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NORTHERN UTILITIES NH/ME **6 LIBERTY LANE WEST** HAMPTON, NH 03842-1720

knowles@unitil.com

ATTN: STEVEN HAMBLEN

NORTHERN UTILITIES NH

325 WEST ROAD

PORTSMOUTH, NH 03801 

deschambeault@unitil.com

ATTN: STEVEN HAMBLEN

Sales Ord No: Order Date:

Account Cd:

Salesperson:

26092 06/05/18

**UNITIL PL** 

Taxable:

Pmt Terms: NET 15 Shipper No:0

Ship Date: 06/06/18

Purchase Order: NNH 70752

**UI TRUCK** 

Ship Via: FOB:

**PLANT** 

Job Number:

Line

Qty Shipped

Backordered

Part Number/Description

Discount

Price

UM

**Extended Price** 

Return Policy: 30 days: No charge for manufacturers defect, otherwise 30% restock fee. Special Orders: NO Returns unless defective.

Subtotal:

\$11,991.15

Freight:

\$0.00

Total:

\$11,991.15

	Invoice Reconcilia	ation				
Description of Test/Repair	Size of Meter	Cos	t per Test	t Quantity		Total
Class A Repair	Domestic	\$	22.95	8	\$,	183.60
Class A Repair	Class 400	\$	22.56		\$	-
Class A Repair	Class 700	\$	79.91		\$	
Class A Repair	Class 800/1000	\$	77.18		\$	-
Class A Repair	Rotary (all sizes)	\$	73.44		\$	
Class B Repair	Domestic	\$	35.60	8	\$	284.80
Class B Repair	Class 400	\$	36.55	2	\$	73.10
Class B Repair	Class 700	\$	158.60		\$	-
Class B Repair	Class 800/1000	\$	157.35	4	\$	629.40
Class B Repair	Rotary 1.5M	\$	274.36		\$	-
Class B Repair	Rotary 3M - 5M	\$	274.36	25	\$	6,859.00
Class B Repair	Rotary 7M	\$	243.92	2	\$	487.84
Class B Repair	Rotary 11M	\$	243.92	1	\$	243.92
Class B Repair	Rotary 16M	\$	274.36	1	\$	274.36
Class B Repair	Rotary 23M	\$	334.52		\$	-
Class C Repair	Domestic	\$	40.91	3	\$	122.73
Class C Repair	Class 400	\$	42.50		\$	-
Class C Repair	Class 700	\$	186.24		\$	-
Class C Repair	Class 800/1000	\$	193.51		\$	-
Class J Repair - Intest/Condemn	Domestic	\$	10.01	23	\$	230.23
Class J Repair - Intest/Condemn	Class 400	\$	10.01	2	\$	20.02
Class J Repair - Intest/Condemn	Class 700 - 1000	\$	58.61	1	\$	58.61
Class J Repair - Intest/Condemn	Class 1400	\$	66.29		\$	-
Class J Repair - Intest/Condemn	Class 2300	\$	71.73		\$	-
Class J Repair - Intest/Condemn	Class 5000	\$	78.53		\$	-
Class J Repair - Intest/Condemn	Rotary 1.5M - 7M	\$	71.26	3	\$	213.78
Class J Repair - Intest/Condemn	Rotary 11M	\$	73.98		\$	-
Class J Repair - Intest/Condemn	Rotary 16M	\$	76.69		\$	-
Class J Repair - Intest/Condemn	Rotary 23M	\$	82.14		\$	-
是国际的人						
Special Test Domestic Meter		\$	28.56	1	\$	28.56
Special Test Large Capacity Meter		\$	53.72		\$	-
Special Test Rotary Meter		\$	47.94		\$	-

Install New Meter Badges	All Diaphragm Sizes	\$ 2.95	33	\$ 97.35
Install New Badger/Itron Endpoints	All Diaphragm Sizes	\$ 5.20	36	\$ 187.20
New Diaphragm Meter Parts	All Diaphragm Sizes	\$ 466.17	N/A	\$ 466.17
New Rotary Meter Parts	All Rotary Sizes	\$ 724.48	N/A	\$ 724.48
Special Test Shipping	All	,	N/A	\$ -
DELVCHG - PU	Total Shipment	\$ 403.00	N/A	\$ 403.00
DELVCHG - DEL	Total Shipment	\$ 403.00	N/A	\$ 403.00
Invoice #	28937		Total	\$ 11,991.15
Invoice Date	6/6/2018			

**Customer Orders** 1995 Industrial Blvd Reynoldsville, PA 15851-0190 Phone: (814) 653-8269 or 653-8411

Fax: (814) 653-7306

Please Remit Payment To: Invoice Number:

**UTILITIES & INDUSTRIES** 

c/o DBI Inc.

660 Longview Rd, Suite 2 Fairmount City, PA 16224

29227

1

Invoice Date:

09/11/18

Page:

Freight is F.O.B. Plant.

All sales are subject to Net 30 Day payment terms.

A service charge of 1.5% per month will be added to any unpaid balance of 30 days or more.

NORTHERN UTILITIES NH/ME **6 LIBERTY LANE WEST** HAMPTON, NH 03842-1720

knowles@unitil.com

ATTN: STEVEN HAMBLEN

NORTHERN UTILITIES NH

325 WEST ROAD

H PORTSMOUTH, NH 03801

deschambeault@unitil.com

ATTN: STEVEN HAMBLEN

Sales Ord No: Order Date: Account Cd:

Salesperson:

26359 09/10/18

UNITIL PL

Taxable: N Pmt Terms: NET 15

Shipper No:0 Ship Date: 09/11/18 Purchase Order: NNH 72297

**UI TRUCK** 

Ship Via: FOB:

**PLANT** 

Line	Qty Shipped	Backordered	Part Number/Description	Discount	Price	UM	Extended Price
	136	0	CLASS J REP DOM	0.00	\$10.0100	EA	\$1,361.36
			UNITIL INTEST/CONDEMN	N DOM			
	20	0	CLASS J REP 400	0.00	\$10.0100	EA	\$200.20
			UNITIL INTEST/CONDEMN	N 400'S			
	6	0	CLASS J REP LC	0.00	\$58.6100	EA	\$351.66
			UNITIL INTEST/CON LC 70	00-1000			
	11	0	CLASS J REP ROT	0.00	\$71.2600	EA	\$783.86
			UNITIL INTEST/CON ROT	1.5M-7M			
	1	0	CLASS J REP ROT	0.00	\$73.9800	EA	\$73.98
			UNITIL INTEST/CON ROT	11M			
	34	0	REPAIR CLASS A	0.00	\$22.9500	EA	\$780.30
			AMERICAN/ROCKWELL D	OM METERS			*,
	145	0	REPAIR CLASS B	0.00	\$35.6000	EA	\$5,162.00
			AMERICAN/ROCKWELL D	OM METER			
	18	0	REPAIR CLASS C	0.00	\$40.9100	EA	\$736.38
			AMERICAN/ROCKWELL D	OM METER			
	1	0	EXTRA PARTS DOM	0.00	\$870.1200	EA	\$870.12
			DOMESTIC EXTRTA PART	rs			
	3	0	REPAIR CLASS A	0.00	\$22.5600	FA	\$67.68
	Ü	· ·	400 CLASS METERS	0.00	<b>422.000</b>	_, .	ψ07.00
	10	0	REPAIR CLASS B	0.00	\$36.5500	EA	\$365.50
		· ·	400 CLASS METERS	0.00	400.0000		φουσσ
	1	0	EXTRA PARTS DOM	0.00	\$71.5000	EA	\$71.50
			EXTRA PARTS 400 CLASS	METERS	•		3.000 900 900
	68	0	CLASS B REPAIR	0.00	\$157.3500	EA	\$10,699.80
			AL800/1000 LC METER				
	1	0	EXTRA PARTS LC	0.00	\$1,521.5700	EA	\$1,521.57

**Customer Orders** 1995 Industrial Blvd Reynoldsville, PA 15851-0190 Phone: (814) 653-8269 or 653-8411

Fax: (814) 653-7306

Please Remit Payment To: Invoice Number:

**UTILITIES & INDUSTRIES** 

c/o DBI Inc.

660 Longview Rd, Suite 2 Fairmount City, PA 16224

29227

Invoice Date:

09/11/18

2 Page:

Freight is F.O.B. Plant.

All sales are subject to Net 30 Day payment terms.

A service charge of 1.5% per month will be added to any unpaid balance of 30 days or more.

NORTHERN UTILITIES NH/ME **6 LIBERTY LANE WEST** 

HAMPTON, NH 03842-1720 knowles@unitil.com

ATTN: STEVEN HAMBLEN

NORTHERN UTILITIES NH

325 WEST ROAD

PORTSMOUTH, NH 03801

deschambeault@unitil.com

ATTN: STEVEN HAMBLEN

Sales Ord No: Order Date: Account Cd:

Salesperson:

26359 09/10/18

0

UNITIL PL

Taxable: N Pmt Terms:NET 15

Shipper No:0

Ship Date: 09/11/18

Purchase Order: NNH 72297

Ship Via: FOB:

**UI TRUCK** PLANT

Job Number:

Line

Qty Shipped Backordered

Part Number/Description

Discount

Price

UM

**Extended Price** 

#### LARGE CAPACITY EXTRA PARTS

240	0	DDM INSTALL BADGES	0.00	\$2.9500	EA	\$708.00
190	0	DDM REPLACE MFG BADGES AS	0.00 S NEEDED	\$2.9500	EA	\$560.50
278	0	DDM INSTALL ERTS	0.00	\$5.2000	EA	\$1,445.60
1	0	DELVCHG-PU UNITIL PICKUP CHARGES	0.00	\$403.0000	EA	\$403.00
1	0	DELVCHG-DEL UNITIL DELIVERY CHARGE	0.00 S	\$403.0000	EA	\$403.00

Return Policy: 30 days: No charge for manufacturers defect, otherwise 30% restock fee. Special Orders: NO Returns unless defective.

Subtotal:

\$26,566.01

Freight:

\$0.00

Total:

\$26,566.01

	Invoice Reconcili	ation			
Description of Test/Repair	Size of Meter	Cos	t per Test	Quantity	Total
Class A Repair	Domestic	\$	22.95	34	\$ 780.30
Class A Repair	Class 400	\$	22.56	3	\$ 67.68
Class A Repair	Class 700	\$	79.91		\$ -
Class A Repair	Class 800/1000	\$	77.18		\$ -
Class A Repair	Rotary (all sizes)	\$	73.44		\$ -
Class B Repair	Domestic	\$	35.60	145	\$ 5,162.00
Class B Repair	Class 400	\$	36.55	10	\$ 365.50
Class B Repair	Class 700	\$	158.60		\$ -
Class B Repair	Class 800/1000	\$	157.35	68	\$ 10,699.80
Class B Repair	Rotary 1.5M	\$	274.36		\$ -
Class B Repair	Rotary 3M - 5M	\$	274.36		\$ -
Class B Repair	Rotary 7M	\$	243.92		\$ -
Class B Repair	Rotary 11M	\$	243.92		\$ -
Class B Repair	Rotary 16M	\$	274.36		\$ -
Class B Repair	Rotary 23M	\$	334.52		\$ -
Class C Repair	Domestic	\$	40.91	18	\$ 736.38
Class C Repair	Class 400	\$	42.50		\$ -
Class C Repair	Class 700	\$	186.24		\$ -
Class C Repair	Class 800/1000	\$	193.51		\$ -
Class J Repair - Intest/Condemn	Domestic	\$	10.01	136	\$ 1,361.36
Class J Repair - Intest/Condemn	Class 400	\$	10.01	20	\$ 200.20
Class J Repair - Intest/Condemn	Class 700 - 1000	\$	58.61	6	\$ 351.66
Class J Repair - Intest/Condemn	Class 1400	\$	66.29		\$ -
Class J Repair - Intest/Condemn	Class 2300	\$	71.73		\$ -
Class J Repair - Intest/Condemn	Class 5000	\$	78.53		\$ -
Class J Repair - Intest/Condemn	Rotary 1.5M - 7M	\$	71.26	11	\$ 783.86
Class J Repair - Intest/Condemn	Rotary 11M	\$	73.98	1	\$ 73.98
Class J Repair - Intest/Condemn	Rotary 16M	\$	76.69		\$ -
Class J Repair - Intest/Condemn	Rotary 23M	\$	82.14		\$ -
Special Test Domestic Meter		\$	28.56		\$ -
Special Test Large Capacity Meter		\$	53.72		\$ -
Special Test Rotary Meter		\$	47.94		\$ -

Install New Meter Badges	All Diaphragm Sizes	\$ 2.95	430	\$ 1,268.50
Install New Badger/Itron Endpoints	All Diaphragm Sizes	\$ 5.20	278	\$ 1,445.60
New Diaphragm Meter Parts	All Diaphragm Sizes	\$ 2,463.19	N/A	\$ 2,463.19
New Rotary Meter Parts	All Rotary Sizes		N/A	\$ -
Special Test Shipping	All		N/A	\$ -
DELVCHG - PU	Total Shipment	\$ 403.00	N/A	\$ 403.00
DELVCHG - DEL	Total Shipment	\$ 403.00	N/A	\$ 403.00
Invoice #	29227		Total	\$ 26,566.01
Invoice Date	9/11/2018			

**Customer Orders** 1995 Industrial Blvd Reynoldsville, PA 15851-0190 Phone: (814) 653-8269 or 653-8411

Fax: (814) 653-7306

Please Remit Payment To: Invoice Number:

**UTILITIES & INDUSTRIES** 

c/o DBI Inc.

660 Longview Rd, Suite 2 Fairmount City, PA 16224

29657

Invoice Date:

12/27/18

Page: 1

Freight is F.O.B. Plant.

All sales are subject to Net 30 Day payment terms.

A service charge of 1.5% per month will be added to any unpaid balance of 30 days or more.

NORTHERN UTILITIES NH 325 WEST ROAD PORTSMOUTH, NH 03801

ATTN: STEVEN HAMBLEN

NORTHERN UTILITIES ME

376 RIVERSIDE

H INDUSTRIAL PARKWAY

PORTLAND, ME 04103

ATTN: CHRIS DUBE

Sales Ord No: Order Date: Account Cd:

Salesperson:

26697 12/10/18

UNITIL PL

Taxable: N

Pmt Terms: NET 15 Shipper No:0

Ship Date: 12/11/18

Purchase Order: NNH72297

**UI TRUCK** 

Ship Via: FOB:

PLANT

Line	Qty Shipped	Backordered	Part Number/Description	Discount	Price	UM	Extended Price
	183	0	CLASS J REP DOM	0.00	\$10.0100	EA	\$1,831.83
			UNITIL INTEST/CONDEMN				
	13	0	CLASS J REP 400	0.00	\$10.0100	EA	\$130.13
		_	UNITIL INTEST/CONDEMN				<b>^</b>
	15	0	CLASS J REP LC	0.00	\$58.6100	EA	\$879.15
	20	0	UNITIL INTEST/CON LC 70		£74 0000	Ε.Δ	¢4 00E 00
	28	0	CLASS J REP ROT UNITIL INTEST/CON ROT	0.00	\$71.2600	EA	\$1,995.28
			UNITIE INTESTICON ROT	I .DIVI-7 IVI			
	2	0	INTEST DOM	0.00	\$28.5600	FA	\$57.12
	2	Ü	SPECIAL TEST DOMESTIC		Ψ20.0000		ΨΟΥ.12
	39	0	REPAIR CLASS A	0.00	\$22.9500	EA	\$895.05
			AMERICAN/ROCKWELL DO	OM METERS			
	163	0	REPAIR CLASS B	0.00	\$35.6000	EA	\$5,802.80
			AMERICAN/ROCKWELL DO	OM METER			
	6	0	REPAIR CLASS C	0.00	\$40.9100	EA	\$245.46
			AMERICAN/ROCKWELL DO				
	1	0	EXTRA PARTS DOM DOMESTIC EXTRTA PART	0.00 S	\$750.8900	EA	\$750.89
	8	0	REPAIR CLASS B	0.00	\$36.5500	<b>⊏</b> ∧	\$292.40
	O	U	400 CLASS METERS	0.00	ψ30.3300		Ψ232.40
	1	0	EXTRA PARTS DOM	0.00	\$44.8800	FA	\$44.88
		ū	EXTRA PARTS 400 CLASS				
	16	0	CLASS B REPAIR	0.00	\$157.3500	EA	\$2,517.60
			AL800/1000 LC METER				
	1	0	EXTRA PARTS LC	0.00	\$539.3600	EA	\$539.36
			LARGE CAPACITY EXTRA	PARTS			

**Customer Orders** 1995 Industrial Blvd Reynoldsville, PA 15851-0190 Phone: (814) 653-8269 or 653-8411

Fax: (814) 653-7306

Please Remit Payment To: Invoice Number:

**UTILITIES & INDUSTRIES** 

c/o DBI Inc.

29657

Invoice Date:

12/27/18

Page: 2

660 Longview Rd, Suite 2 Fairmount City, PA 16224

Freight is F.O.B. Plant.

All sales are subject to Net 30 Day payment terms.

A service charge of 1.5% per month will be added to any unpaid balance of 30 days or more.

NORTHERN UTILITIES NH 325 WEST ROAD PORTSMOUTH, NH 03801

ATTN: STEVEN HAMBLEN

NORTHERN UTILITIES ME

376 RIVERSIDE

H INDUSTRIAL PARKWAY

PORTLAND, ME 04103

ATTN: CHRIS DUBE

Sales Ord No: Order Date: Account Cd:

Salesperson:

26697 12/10/18 UNITIL PL

0

Taxable: N Pmt Terms: NET 15 Shipper No:0

Ship Date: 12/11/18

Purchase Order: NNH72297 Ship Via: **UI TRUCK** 

PLANT

FOB:

Line	Qty Shipped	Backordered	Part Number/Description	Discount	Price	UM	Extended Price
	1	0	ROTARY REPAIR B 1.5M ROTARY METER	0.00	\$274.3600	EA	\$274.36
	127	0	ROTARY REPAIR B 3M -5M ROTARY METER	0.00	\$274.3600	EA	\$34,843.72
	. 12	0	ROTARY REPAIR B 7M ROTARY METER	0.00	\$243.9200	EA	\$2,927.04
	3	0	ROTARY REPAIR B 11M ROTARY METER	0.00	\$243.9200	EA	\$731.76
	2	0	ROTARY REPAIR B 16M ROTARY METER	0.00	\$274.3600	EA	\$548.72
	1	0	EXTRA PARTS ROT ROTARY METER EXTRA F	0.00 PARTS	\$5,457.1700	EA	\$5,457.17
	192	0	DDM INSTALL BADGES	0.00	\$2.9500	EA	\$566.40
	185	0	DDM REPLACE MFG BADGES	0.00	\$2.9500	EA	<b>\$545</b> .75
	352	0	DDM INSTALL ERTS	0.00	\$5.2000	EA	\$1,830.40
	1	0	DELVCHG-PU UNITIL PICKUP CHARGES	0.00	\$404.0000	EA	\$404.00
	1	0	DELVCHG-DEL UNITIL DELIVERY CHARG	0.00 ES	\$404.0000	EA	\$404.00

**Customer Orders** 1995 Industrial Blvd Reynoldsville, PA 15851-0190

Phone: (814) 653-8269 or 653-8411 Fax: (814) 653-7306

Please Remit Payment To: Invoice Number:

**UTILITIES & INDUSTRIES** 

Invoice Date:

29657

12/27/18

Page: 3

c/o DBI Inc. 660 Longview Rd, Suite 2 Fairmount City, PA 16224

Freight is F.O.B. Plant.

All sales are subject to Net 30 Day payment terms.

A service charge of 1.5% per month will be added to any unpaid balance of 30 days or more.

NORTHERN UTILITIES NH 325 WEST ROAD

PORTSMOUTH, NH 03801

ATTN: STEVEN HAMBLEN

NORTHERN UTILITIES ME

376 RIVERSIDE

INDUSTRIAL PARKWAY

PORTLAND, ME 04103

ATTN: CHRIS DUBE

Sales Ord No: Order Date:

Account Cd:

Salesperson:

26697 12/10/18

UNITIL PL

Taxable: N

Pmt Terms: NET 15 Shipper No:0

Ship Date: 12/11/18

Purchase Order: NNH72297 Ship Via:

**UI TRUCK** 

FOB:

PLANT

Job Number:

Line

0

Qty Shipped Backordered

Part Number/Description

Discount

Price

UM

**Extended Price** 

Return Policy: 30 days: No charge for manufacturers defect, otherwise 30% restock fee. Special Orders: NO Returns unless defective.

Subtotal:

\$64,515.27

Freight:

\$0.00

Total:

\$64,515.27

	Invoice Reconcilia	ation				
Description of Test/Repair	Size of Meter	Cos	t per Test	Quantity		Total
Class A Repair	Domestic	\$	22.95	39	\$	895.05
Class A Repair	Class 400	\$	22.56		\$	-
Class A Repair	Class 700	\$	79.91		\$	-
Class A Repair	Class 800/1000	\$	77.18		\$	_
Class A Repair	Rotary (all sizes)	\$	73.44		\$	•
Class B Repair	Domestic	\$	35.60	163	\$	5,802.80
Class B Repair	Class 400	\$	36.55	8	\$	292.40
Class B Repair	Class 700	\$	158.60	7.	\$	-
Class B Repair	Class 800/1000	\$	157.35	16	\$	2,517.60
Class B Repair	Rotary 1.5M	\$	274.36	1	\$	274.36
Class B Repair	Rotary 3M - 5M	\$	274.36	127	\$ :	34,843.72
Class B Repair	Rotary 7M	\$	243.92	12	\$	2,927.04
Class B Repair	Rotary 11M	\$	243.92	3	\$	731.76
Class B Repair	Rotary 16M	. \$	274.36	2	\$	548.72
Class B Repair	Rotary 23M	\$	334.52		\$	-
Class C Repair	Domestic	\$	40.91	6	\$	245.46
Class C Repair	Class 400	\$	42.50		\$	-
Class C Repair	Class 700	\$	186.24		\$	-
Class C Repair	Class 800/1000	\$	193.51		\$	-
Class J Repair - Intest/Condemn	Domestic	\$	10.01	183	\$	1,831.83
Class J Repair - Intest/Condemn	Class 400	\$	10.01	13	\$	130.13
Class J Repair - Intest/Condemn	Class 700 - 1000	\$	58.61	15	\$	879.15
Class J Repair - Intest/Condemn	Class 1400	\$	66.29		\$	-
Class J Repair - Intest/Condemn	Class 2300	\$	71.73		\$	-
Class J Repair - Intest/Condemn	Class 5000	\$	78.53		\$	-
Class J Repair - Intest/Condemn	Rotary 1.5M - 7M	\$	71.26	28	\$	1,995.28
Class J Repair - Intest/Condemn	Rotary 11M	\$	73.98		\$	-
Class J Repair - Intest/Condemn	Rotary 16M	\$	76.69		\$	-
Class J Repair - Intest/Condemn	Rotary 23M	\$	82.14		\$	•
Special Test Domestic Meter		\$	28.56	2	\$	57.12
Special Test Large Capacity Meter		\$	53.72		\$	57.12
Special Test Rotary Meter		\$	47.94		\$	
special rest Rotary Meter		Ι φ	47.74		φ	-

Install New Meter Badges All D Install New Badger/Itron Endpoints All D	Diaphragm Sizes	 2.95	377	\$ 1,112.15
Install New Badger/Itron Endpoints All D				1,110.10
	laphragm Sizes	\$ 5.20	352	\$ 1,830.40
New Diaphragm Meter Parts All D	iaphragm Sizes	\$ 1,335.13	N/A	\$ 1,335.13
New Rotary Meter Parts All R	lotary Sizes	\$ 5,457.17	N/A	\$ 5,457.17
Special Test Shipping All		750	N/A	\$ -
DELVCHG - PU Total	l Shipment	\$ 404.00	N/A	\$ 404.00
DELVCHG - DEL Total	l Shipment	\$ 404.00	N/A	\$ 404.00
Invoice #	29657		Total	\$ 64,515.27
Invoice Date	12/27/2018			

#### Unitil - Northern Gas Meter Testing Facility Cost Analysis 2018

#### **Cost Analysis**

The 2018 cost for Northern to outsource the testing of the 1230 meters associated with its NH customers was \$32,735, or an average of \$26.61 per meter.

The total cost for the 2918 meters associated with Unitil's three gas companies was \$57,984 or an average of \$19.87 per meter.

It is estimated that in order to bring the meter testing and servicing operation back inhouse, Unitil would need to hire two full-time employees and the annual cost with benefits would be:

2 Full Time Employees w/ Benefits	\$181,697
Utility Expenses	\$3,500
Tool Replacements	\$1,000
Total	\$186,197

The estimated annual cost of \$186,197 for two employees, utilities, and tools would result in the cost per meter test for the 2918 meters tested in 2018 to be \$63.81 per meter.

Additional consideration should be taken for the start-up costs that would be incurred and depreciated over time to facilitate a meter testing laboratory are as follows:

	Location
Start-up Costs	Portsmouth
Facility Estimate	\$1,064,792
Equipment Estimate	\$273,352
Total	\$1,338,144

#### Conclusion

Due to the estimated annual operating costs of \$186,197 exceeding the most recent annual expenditures of \$57,984 paid to vendors for performing testing, it is not economical at this time for Unitil to pursue establishing a gas meter testing facility.