

# **PUBLIC VERSION**

**STATE OF NEW JERSEY  
BOARD OF PUBLIC UTILITIES**

**I/M/O THE PETITION OF PUBLIC ) BPU Docket Nos. EO13020155 and  
SERVICE ELECTRIC & GAS ) GO13020156  
COMPANY FOR APPROVAL OF )  
THE ENERGY STRONG PROGRAM )**

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**DIRECT TESTIMONY OF EDWARD A. McGEE  
ON BEHALF OF THE  
DIVISION OF RATE COUNSEL**

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**Dated: October 28, 2013**

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# **PUBLIC VERSION**

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**BPU DOCKET NO. EO13020155 and GO13020156**

**I. Introduction**

**Q. PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.**

A. My name is Edward A. McGee. My business address is P.O. Box #1659, Bethany Beach, DE. I am Principal Consultant of McGee Consulting, LLC, and I am currently working as an Engineering Associate with the Acadian Consulting Group (“ACG”). ACG is a research and consulting firm that specializes in the analysis of regulatory, economic, financial, accounting, statistical, and public policy issues associated with regulated and energy industries. ACG is a Louisiana-registered Limited Liability Company, formed in 1995, and is located at 5800 One Perkins Place, Suite 5-F, Baton Rouge, Louisiana.

**Q. DO YOU HOLD ANY ACADEMIC DEGREES?**

A. Yes. I was graduated from the University of Notre Dame with Bachelor and Master Degrees in Chemical Engineering. I was also graduated from the University of Chicago with a Master’s Degree in Business Administration (“MBA”). Attachment 1 provides my academic vita that includes a listing of my experience as a gas practice consultant and related positions in the energy industry.

**Q. HAVE YOU PREPARED ANY SCHEDULES IN SUPPORT OF YOUR RECOMMENDATIONS?**

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1 A. Yes. I have prepared six schedules in support of my direct testimony that were prepared  
2 by me or under my direct supervision.

3 **Q. WHAT IS THE SCOPE OF YOUR TESTIMONY IN THIS PROCEEDING?**

4 A. I have been retained by the New Jersey Division of Rate Counsel (“Rate Counsel”) to  
5 provide an expert opinion to the Board of Public Utilities (“BPU” or “Board”) on the Energy  
6 Strong gas system hardening modifications proposed by Public Service Electric & Gas Company  
7 of New Jersey (“PSE&G” or “the Company”). Dr. David Dismukes will also be testifying  
8 regarding a number of policy, program design, and economic impact issues associated with the  
9 “Energy Strong” proposal for the gas system.

10 **Q. HOW IS THE REMAINDER OF YOUR TESTIMONY ORGANIZED?**

11 A. My testimony is organized into the following sections:

- 12 • Section II: Summary of Recommendations
- 13 • Section III: Overview of the Company’s Energy Strong Gas System Proposal
- 14 • Section IV: Criteria for Pipe Replacement
- 15 • Section V: Consequences of Raising Pipe Pressures
- 16 • Section VI: Need for Pipe Replacement in Flood Areas
- 17 • Section VII: Raising M&R Station Facilities
- 18 • Section VIII: Conclusions and Recommendations
- 19 • Section IX: Attachment 1
- 20 • Section X: Schedules EAM-1 through EAM-6

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1 **II. Summary of Recommendations**

2 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS REGARDING THE**  
3 **COMPANY’S PROPOSAL TO REPLACE 750 MILES OF MAINS AND 40,000**  
4 **ASSOCIATED SERVICES.**

5 A. My primary recommendation is that the Board reject the Company’s proposal to replace  
6 mains and associated service lines in flood zones and contiguous “proximity” areas for the  
7 following reasons:

- 8 • The criteria the Company uses to select the pipe in flood hazard areas and areas in  
9 proximity are primarily a function of minimizing inconvenience to customers who may  
10 suffer outages. The Company should not be permitted to place any other criteria ahead of  
11 safety.
- 12 • The selection method used by the Company is not a risk-based approach as is used to  
13 identify pipes for replacement under its annual pipe replacement program.

14 **Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE COMPANY’S PLAN TO**  
15 **RAISE PRESSURES IN THE PROPOSED REPLACED PIPES?**

16 A. The pressure in the replaced pipe systems should continue as it currently exists (utilization  
17 pressure) without raising it to higher levels. This will reduce substantially (by 63%) the mileage  
18 of pipes that need to be replaced, since it will not be necessary to replace mains in the “proximity”  
19 area. Furthermore, increasing the pressure of the mains will increase the risks of the attached  
20 services, which means increased risks to buildings, their occupants, first responders, Company  
21 employees, and the neighboring public.

22 **Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE COMPANY’S NEED TO**  
23 **REPLACE PIPES AND RAISE PRESSURES?**

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1 A. The Company has not proven a sufficient need for its Energy Strong pipe replacement  
2 program to reduce/prevent water intrusion and subsequent customer outages. As discussed below:

3 • The number of gas customer outages experienced during recent storm events has not been  
4 extensive. These outages would not meet the Board’s recent definition for a “Major Storm  
5 Event”<sup>1</sup> for two of the three most recent storms.

6 • Hours required by Company personnel to remove water from mains have not increased  
7 substantially in recent storm years.

8 • Water intrusion is a common occurrence with an average of 1,041 instances per year  
9 requiring personnel to remove water from Company pipes.

10 • The Company considers the current level of likelihood of water infiltration to be  
11 “acceptable” to the Company.<sup>2</sup>

12 • Water intrusion can occur on any portion of the system – even portions not lying in flood  
13 zones. Therefore, the proposed pipe replacement in the Company’s flood zone areas might  
14 not ensure the desired objective of minimizing or eliminating customer outages. The  
15 Company has not provided any specific analysis in this area.

16 **Q. WHAT ARE YOUR RECOMMENDATIONS REGARDING THE COMPANY’S**  
17 **PROPOSAL TO RAISE ITS METERING & REGULATING FACILITIES?**

18 A. Regarding the Company’s Metering & Regulating (“M&R”) stations, I recommend that  
19 only the stations that have actually flooded during the recent storms should be raised above the  
20 flood level. Other M&R facilities that are proposed for similar raising solely because they are

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<sup>1</sup> Pursuant to the Board’s Order, *In the Matter of the Board’s Establishment of a Generic Proceeding to Review Costs, Benefits and Reliability Impacts of Major Storm Events; In the Matter of the Board’s Review of the Petition of Public Service Electric and Gas Company for Approval of the Energy Strong Program*, Docket Nos. AX 13030197; EO13020155, GO13020156, issued March 20, 2013, pp. 1-2.

<sup>2</sup> Company’s Response to RCR-G-POL-22.

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1 below the current 100-year flood level, should not be raised – at least not at this time or as part of  
2 this proposal. Improvements in the gas system at these facilities should continue as in past years,  
3 with incremental improvements and repairs being made as necessary and appropriate. As further  
4 experience is gained at the time of future storms, further analysis of more comprehensive  
5 enhancements such as raising the facilities or equipment can be made, depending on the extent of  
6 flooding encountered, if any.

### 7 **III. Overview of Energy Strong Gas System Proposal**

#### 8 **Q. PLEASE EXPLAIN THE COMPANY’S ENERGY STRONG GAS PROPOSAL.**

9 A. The Company has put forth a two-part plan for the gas portion of its Energy Strong  
10 proposal: 1) Replacement of Utilization Pressure Cast Iron and Associated Services and 2) Raising  
11 the Height of Selected Metering and Regulating Station Facilities and Equipment.

#### 12 **Q. WHAT IS THE OBJECTIVE OF THE ENERGY STRONG PROPOSAL?**

13 A. Both parts of the plan are described as gas delivery infrastructure hardening.<sup>3</sup> They both  
14 have an objective of minimizing service outages and Company response times to the Company’s  
15 gas customers during storms.<sup>4</sup>

#### 16 **Q. PLEASE DESCRIBE THE COMPANY’S PROPOSED PIPE REPLACEMENT** 17 **PROGRAM.**

18 A. The Company’s proposed pipe replacement program consists of replacing approximately  
19 750 miles of cast iron main with either high-density polyethylene plastic pipes or with coated,  
20 cathodically protected welded steel pipes. The program also includes raising the pressure in the

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<sup>3</sup> Company’s Petition at ¶93; Jorge L. Cardenas, Direct Testimony, 7:151-153.

<sup>4</sup> Jorge L. Cardenas, Direct Testimony, 2:30-41.

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1 replaced pipes by increasing the pressure in these systems from utilization pressure (“UP”) to  
2 higher operating pressures.<sup>5</sup> The cast iron mains targeted will be those operating at UP within or  
3 in proximity of a flood hazard zone. Concurrent with the main replacement, PSE&G proposes to  
4 replace approximately 40,000 unprotected steel service pipes that are associated with these mains.<sup>6</sup>

5 **Q. WHAT IS THE PURPOSE OF THE COMPANY’S PROPOSED PIPE**  
6 **REPLACEMENT PROGRAM?**

7 A. The purpose of the pipe replacement program is to minimize the number of leaks in the gas  
8 piping in areas that have previously flooded or could potentially flood. The leaks constitute the  
9 major source of entry for water intrusion into these pipes, which in turn can lead to customer  
10 outages.

11 **Q. HOW DOES THE PIPE REPLACEMENT PROGRAM MINIMIZE THE NUMBER**  
12 **OF LEAKS?**

13 A. The Company proposes to replace the existing cast iron mains with either plastic or  
14 cathodically-protected steel mains and to replace the existing unprotected steel service lines with  
15 plastic service lines.<sup>7</sup> The replacement materials have significantly lower leak rates than the  
16 existing materials, as shown in Schedule EAM-1.

17 **Q. WHICH PIPES DOES THE COMPANY PLAN TO REPLACE?**

18 A. First, the Company proposes to replace all UP cast iron mains and associated unprotected  
19 steel services in municipalities that have previously had water intrusion. Second, it proposes to  
20 replace all similar pipes in areas falling within FEMA’s 100-year flood zone. Third, pipes in the

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<sup>5</sup> Jorge L. Cardenas, Direct Testimony, 39:891-896.

<sup>6</sup> Company’s Petition at ¶101-102; Jorge L. Cardenas, Direct Testimony, 39:891-896.

<sup>7</sup> Company’s Petition at ¶101-102; Jorge L. Cardenas, Direct Testimony, 39:891-893.



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1 surrounding areas, called the “proximity areas,” will also be replaced in order to be able to raise  
2 the pressure in connected parts of the gas system.<sup>8</sup>

## 3 **IV. Criteria for Pipe Replacement**

### 4 **Q. WHAT ARE THE COMPANY’S CRITERIA FOR THE REPLACEMENTS?**

5 A. The first criterion the Company is using – both in actually flooded and in potential flooding  
6 areas – appears to be the replacement of leak-prone pipes that could permit water intrusion in a  
7 storm and potentially cause customer outages. The second criterion is only applied to “proximity”  
8 areas. That criterion appears to be simply that the pipes should be replaced so that the Company  
9 will be able to raise operating pressures in contiguous portions of its system.<sup>9</sup>

### 10 **Q. ARE THESE THE PROPER CRITERIA TO USE FOR PIPE REPLACEMENT?**

11 A. No. The only proper criterion is to minimize safety risks to the Company’s employees, its  
12 customers, and to the general public. **Begin Confidential** [REDACTED]

13 [REDACTED]

14 [REDACTED]  
15 [REDACTED]  
16 [REDACTED]  
17 [REDACTED]  
18 [REDACTED]

19 [REDACTED]  
20 [REDACTED]  
21 [REDACTED]  
22 [REDACTED]

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<sup>8</sup> Company’s Petition at ¶106; Jorge L. Cardenas, Direct Testimony, 41:925-927, 39:893-894.

<sup>9</sup> Company’s Petition at ¶101; Jorge L. Cardenas, Direct Testimony, 39:891-894.

<sup>10</sup> Company’s Response to RCR-G-POL-11, PSEG DIMP 2012, p. 2. Emphasis added.

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1 [REDACTED]

2 [REDACTED]

3 [REDACTED]

4 [REDACTED]

5 [REDACTED]

6 [REDACTED]

7 [REDACTED]

8 [REDACTED]

9 [REDACTED]

10 [REDACTED]

11 [REDACTED]

12 [REDACTED]

13 [REDACTED]

14 [REDACTED]

15 [REDACTED]

16 [REDACTED]

17 [REDACTED]

18 [REDACTED]

19 [REDACTED]

20 [REDACTED]

21 [REDACTED]

22 [REDACTED]

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<sup>11</sup> Company's Response to AARP-3.

<sup>12</sup> Company's Response to S-PSEG-ES-47.

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1 [REDACTED]  
2 [REDACTED]  
3 [REDACTED]  
4 [REDACTED] End Confidential

5 **V. Consequences of Raising Pipe Pressures**

6 **Q. COULD YOU DESCRIBE THE COMPANY’S PROPOSAL TO RAISE PIPE**  
7 **PRESSURES?**

8 A. Yes. The Company proposes to raise pressures in the mains and all of their associated  
9 services once they are replaced. Customers along these lines will have their gas pressure supplied  
10 from either a 15-psig system or from a 60-psig system. Current service to these customers is from  
11 a 0.25-psig Utilization Pressure system.<sup>13</sup>

12 **Q. DOES RAISING THE PRESSURE IN THE REPLACED PIPES HELP MINIMIZE**  
13 **WATER INTRUSION FROM LEAKS?**

14 A. Raising the pressure, as the Company includes in its proposal, would help minimize certain  
15 types of leaks where water could possibly enter (such as on riser assemblies or outside meter sets),  
16 but these are not major sources of leaks. If the Company proceeds appropriately with its normal  
17 pipeline replacement program, the major sources of leaks will already have been removed by  
18 replacing the underground pipe materials for the mains and services with materials that have  
19 significantly lower leak rates. Raising the pressure does not add significantly to the solution.

20 **Q. DOES INCREASING THE PRESSURE HAVE ANY ADVANTAGES?**

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<sup>13</sup> Company’s Response to RCR-G-ENG-8.

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1 A. Yes, increasing pressure in the pipes has the advantage of permitting a moderate decrease  
2 in construction costs (primarily savings in material costs) due to the use of smaller-diameter mains  
3 and services.

4 **Q. DOES INCREASING THE PRESSURE HAVE ANY DRAWBACKS?**

5 A. Yes, increasing pressure in the pipes has many significant drawbacks.

6 **Q. COULD YOU LIST THE MORE SIGNIFICANT DRAWBACKS?**

7 A. Yes. The major drawbacks when raising pressure in the pipes that are proposed for  
8 replacement include:

9 1) The area of replacement would more than double.

10 2) The replacement costs would increase significantly.

11 3) Higher pressures will be brought **up to** the premises – and sometimes **into** the premises  
12 – of customers, thereby increasing their risks.

13 **Q. HOW MANY MILES OF MAIN ARE TO BE REPLACED IN ORDER TO**  
14 **INCREASE THE PRESSURE UNDER THE COMPANY’S PROPOSAL?**

15 A. About 750 miles of cast iron mains are proposed for replacement if the pressure is raised.  
16 This compares to only 280 miles of cast iron mains that would be required to be replaced if the  
17 pressure was kept at 0.25 psig.<sup>14</sup> The proposed mileage is 2.68 times the mileage required if the  
18 pressure is not raised.

19 **Q. HOW DOES THE RAISING OF PRESSURE CAUSE THE SUBSTANTIAL**  
20 **INCREASE IN THE AMOUNT OF PIPES PROPOSED TO BE REPLACED?**

21 A. The reason for this increase is that contiguous sections of mains in the “proximity” area,  
22 i.e. outside of the flood hazard area, will receive their gas from the same higher-pressure systems

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<sup>14</sup> Company’s Response to RCR-G-POL-42.

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1 (15-psig or 60-psig) as the mains being replaced within the flood hazard area, since the gas will  
2 come from the same pressure regulators. In order to receive the gas under higher pressures, the  
3 mains in the “proximity” area, which are also cast iron, must be replaced with more modern  
4 materials. Thus, the mileage of main to be replaced expands to more than two and a half times  
5 when including the proximity area.

6 **Q. PLEASE EXPLAIN HOW THE COSTS FOR PIPE REPLACEMENT WILL**  
7 **INCREASE SUBSTANTIALLY DUE TO INCREASED PRESSURE.**

8 A. The proposed cost of the 750 miles of pipe replacement required with increased gas  
9 pressure is \$1.04 billion.<sup>15</sup> These replacements will have a smaller diameter than the current lines,  
10 since the raised pressure permits smaller pipes.<sup>16</sup>

11 If the pressure was not raised, the required mileage of replacements would only be 280  
12 miles. However, since the lines will be same size as the existing lower-pressure lines, there will be  
13 a somewhat higher cost per mile than the proposed smaller-diameter lines. Still, the cost savings  
14 due to replacing pipes in a much smaller area should offset any cost increase for replacements in  
15 that area.

16 **Q. PLEASE EXPLAIN HOW RAISING THE PRESSURE IN THE REPLACED PIPES**  
17 **WILL AFFECT RISKS.**

18 A. When pressure is raised in the replaced mains, the pressure is also raised in the attached  
19 service lines. The service lines carry the increased pressure from the street area to the buildings.  
20 At the buildings, the pressure is sometimes lowered before it enters the premises, but in the case  
21 of inside meters, the pressure remains at the increased level inside part of the building. In these

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<sup>15</sup> Company’s Petition at ¶110; Jorge L. Cardenas, Direct Testimony, 42:946-947.

<sup>16</sup> Company’s Response to RCR-E-11.

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1 cases, the pressure is raised in the portion of the interior piping that extends from the building entry  
2 through to the regulator which will be installed just upstream of the meter.<sup>17</sup> Risks would be  
3 increased in all cases just outside the building where increased pressures exist as well as inside the  
4 building in the cases of inside meters.

5 **Q. WHAT INFORMATION INDICATES THAT RISKS ARE INCREASED WHEN**  
6 **GAS PRESSURES ARE RAISED?**

7 A. It is an engineering principle that a given size leak hole in a pipe will release more gas  
8 from a pipe of higher pressure than it will from a pipe of lower pressure – all other things being  
9 equal. The more gas released near or inside a building, the greater the risk to building occupants,  
10 first responders, Company employees, and the neighboring public.

11 **Q. IS THERE ANY OTHER INFORMATION THAT INDICATES THAT RISKS ARE**  
12 **INCREASED WHEN GAS PRESSURES ARE RAISED?**

13 A. **Begin Confidential** [REDACTED]  
14 [REDACTED]  
15 [REDACTED]  
16 [REDACTED]  
17 [REDACTED]  
18 [REDACTED]  
19 [REDACTED]  
20 [REDACTED] **End**

21 **Confidential**

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<sup>17</sup> Company's Response to RCR-G-ENG-27.

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1 **VI. Need for Pipe Replacement in Flood Areas**

2 **Q. HAS THE COMPANY INDICATED THAT ITS PROPOSED PIPE**  
3 **REPLACEMENT PLAN IS AN ESSENTIAL PRIORITY?**

4 A. No. In fact, the Company has made the following statement that indicates it does not  
5 necessarily consider pipe replacement in the flood areas to be critical or urgent, but more of an  
6 effort to avoid inconvenience to its customers:

7 The Company recognizes that due to the nature of cast iron construction and gas  
8 being at utilization pressure, there is an inherent level of likelihood of water  
9 infiltration. Although this level of likelihood is considered “acceptable” to the  
10 Company, the Company recognizes the hardship it places on customers during  
11 flood events.<sup>18</sup>

12 **Q. IS WATER INTRUSION A COMMON OCCURRENCE – EVEN WHEN THERE**  
13 **ARE NO MAJOR STORMS?**

14 A. Yes. Schedule EAM-3 indicates that the Company has averaged 1,041 instances per year  
15 over the seven-year period (from 2006 through 2012), when personnel have removed water from  
16 Company pipes.

17 **Q. HAVE THE RECENT STORMS TAXED THE ABILITY OF THE COMPANY TO**  
18 **RESPOND TO WATER INTRUSION INTO ITS GAS MAINS?**

19 A. No. In Mr. Cardenas’s direct testimony, he stated that the hours required to remove water  
20 from the mains can be a key measure. He said: “Removing water infiltration from a UP distribution  
21 system can take extensive time to complete before the system can be restored to customers.”<sup>19</sup> Yet,  
22 as shown in Schedule EAM-4, the number of hours that Company employees have spent removing

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<sup>18</sup> Company’s Response to RCR-G-POL-22.

<sup>19</sup> Jorge L. Cardenas, Direct Testimony, 40:906-908.

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1 water from its mains have not been significantly higher in the past several years, except for 2011  
2 when two storms, Hurricane Irene and Tropical Storm Lee, occurred.

3 **Q. HOW EXTENSIVE HAVE THE OUTAGES BEEN FOR GAS CUSTOMERS?**

4 A. The number of gas customer outages experienced during recent storm events has not been  
5 extensive. Schedule EAM-5 indicates that outages ranging from 45 customers to 1,392 customers  
6 have been experienced during the three most recent storms.

7 The number of gas outages experienced during Superstorm Sandy was 1,133 customers.  
8 This compares, for instance, to electric outages during the same storm of about 2.0 million  
9 customers. Comparing these outages on a per-customer basis, less than one percent of gas  
10 customers were without supply during Superstorm Sandy; whereas, about 90% of electric  
11 customers were without supply.

12 **Q. HOW DOES THE BOARD DEFINE “MAJOR STORM EVENT”?**

13 A. As used in the Board’s March 20, 2013 Order, a “Major Storm Event” means sustained  
14 impact on or interruption of utility service: (1) resulting from conditions beyond the control of the  
15 utility, which may include, but are not limited to, thunderstorms, tornadoes, hurricanes, heat  
16 waves, snow and ice storms; (2) which affects at least 10 percent of the customers in an operating  
17 area; and (3) due to a utility's documentable need to allocate field resources to restore service to  
18 affected areas when one operating area experiences a Major Storm Event, the Major Storm Event  
19 shall be deemed to extend to those other operating areas of that utility which are providing  
20 assistance to the affected areas.<sup>20</sup>

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<sup>20</sup> *In the Matter of the Board’s Establishing a Generic Proceeding to Review the Prudence of Costs Incurred by NJ Utility Companies in Response to Major Storm Events in 2011 and 2012.* Before the New Jersey Board of Public Utilities, Docket No. AX13030196, Order dated March 20, 2013, p. 2.



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1 **Q. WOULD THE NUMBER OF GAS OUTAGES DURING THE RECENT STORMS**  
2 **MEET THE DEFINITION OF A “MAJOR STORM EVENT” FOR THE COMPANY?**

3 A. Only one storm would meet the definition of major storm events for gas operations.  
4 Schedule EAM-6 shows the towns in the Company’s service area that sustained customer gas  
5 outages during the three most recent storms. Also shown are the estimated number of customers  
6 in each of these towns and the percentage of customers losing service.

7 Using a town as the definition of an “operating area,” two of the storms (Superstorm Sandy  
8 and the 2010 Nor’easter) would apparently not meet the Board’s definition of a Major Storm Event  
9 since none of the Company’s towns served suffered outages of 10 percent or more. During  
10 Hurricane Irene, the Board’s definition was apparently met since one town (Totowa Boro) suffered  
11 an outage of 10% or more (14.9%). Thus, when viewed as a gas event (without considering electric  
12 interruptions), two of the storms do not meet the Board’s definition of a “Major Storm Event”  
13 while one storm does.

14 **Q. DO GAS OUTAGES OF A SIMILAR MAGNITUDE DUE TO WATER**  
15 **INTRUSION EVER OCCUR AT GAS COMPANIES DURING TIMES WHEN THERE**  
16 **ARE NO STORMS?**

17 A. Yes. Water intrusion and gas outages are something gas utilities have learned to handle on  
18 a continuing basis.

19 **Q. CAN YOU CITE AN EXAMPLE OF A GAS COMPANY EXPERIENCING**  
20 **OUTAGES DUE TO WATER INTRUSION DURING A TIME WHEN THERE WERE NO**  
21 **STORMS?**

22 A. Yes. During 2012, for instance, a natural gas company, National Grid in Brooklyn, NY,  
23 incurred some 1,100 customer outages due to water intrusion during a period when there were no

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1 storms. This is almost the same number of outages experienced by PSE&G during Superstorm  
2 Sandy. National Grid suffered water intrusion and resulting outages when an underground water  
3 main ruptured near one of its gas mains during a period when there were no storms.<sup>21</sup>

4 **Q. WHAT IMPLICATIONS MIGHT THE NATIONAL GRID NON-STORM**  
5 **OUTAGE EVENT HAVE FOR PSE&G?**

6 A. Events of this type indicate that PSE&G could similarly experience water intrusion and  
7 resultant outages from non-storm events at any time and on nearly the same scale as was incurred  
8 during Superstorm Sandy. The problem could occur on any portion of their system – even portions  
9 not lying in flood zones or in “proximity” areas. Therefore, the proposed pipe replacement in the  
10 Company’s flood zone areas might not ensure the desired objective of minimizing or eliminating  
11 customer outages.

## 12 **VII. Raising M&R Station Facilities**

13 **Q. PLEASE EXPLAIN THE SECOND PART OF THE COMPANY’S PLAN FOR THE**  
14 **GAS PORTION OF ITS ENERGY STRONG PROPOSAL.**

15 A. In the second part of its plan, the Company plans to raise facilities and equipment at certain  
16 M&R stations. The M&R stations that either flooded during the recent storms or those that are  
17 within the current 100-year flood zone are planned to be raised to a level of one foot above that  
18 flood level, at an estimated cost of \$140 million.

19 **Q. DO YOU AGREE WITH THE COMPANY’S PLAN TO RAISE CERTAIN M&R**  
20 **FACILITIES?**

21 A. Partially. I recommend that only the stations that have actually flooded during the recent

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<sup>21</sup> [This Week In Natural Gas Leaks and Explosions](http://www.naturalgaswatch.org/?p=1360) – April 23, 2012. <http://www.naturalgaswatch.org/?p=1360>.

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1 storms should be raised above the flood level. Other M&R facilities that are proposed for similar  
2 raising solely because they are below the current 100-year flood level, should not be raised – at  
3 least not at this time or as part of this proposal. The Company has not provided analysis that the  
4 100-year flood maps of FEMA correlate well with observed flooding.

## 5 **VIII. Conclusions and Recommendations**

6 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS REGARDING THE**  
7 **COMPANY’S PROPOSAL TO REPLACE 750 MILES OF MAINS AND 40,000**  
8 **ASSOCIATED SERVICES.**

9 A. My primary recommendation is that the Board reject the Company’s proposal to replace  
10 mains and associated service lines in flood zones and contiguous “proximity” areas for the  
11 following reasons:

- 12 • The criteria the Company uses to select the pipe in flood hazard areas and areas in  
13 proximity are primarily a function of minimizing inconvenience to customers who may  
14 suffer outages. The Company should not be permitted to place any other criteria ahead of  
15 safety.
- 16 • The selection method used by the Company is not a risk-based approach as is used to  
17 identify pipes for replacement under its annual pipe replacement program.

18 **Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE COMPANY’S PLAN TO**  
19 **RAISE PRESSURES IN THE PROPOSED REPLACED PIPES?**

20 A. The pressure in the replaced pipe systems should continue as it currently exists (utilization  
21 pressure) without raising it to higher levels. This will reduce substantially (by 63%) the mileage  
22 of pipes that need to be replaced, since it will not be necessary to replace mains in the “proximity”

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1 area. Furthermore, increasing the pressure of the mains will increase the risks of the attached  
2 services, which means increased risks to buildings, their occupants, first responders, Company  
3 employees, and the neighboring public.

4 **Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE COMPANY’S NEED TO**  
5 **REPLACE PIPES AND RAISE PRESSURES?**

6 A. The Company has not proven a sufficient need for its Energy Strong pipe replacement  
7 program to reduce/prevent water intrusion and subsequent customer outages. As discussed above:

- 8 • The number of gas customer outages experienced during recent storm events was minimal,  
9 and, these outages would not meet the Board’s recent definition for a “Major Storm Event”  
10 for two of the three most recent storms.
- 11 • Hours required by Company personnel to remove water from mains have not increased  
12 substantially in recent storm years.
- 13 • Water intrusion is a common occurrence with an average 1,041 instances per year that  
14 personnel have removed water from Company pipes.
- 15 • The Company considers the current level of likelihood of water infiltration to be  
16 “acceptable” to the Company.
- 17 • Water intrusion can occur on any portion of the system – even portions not lying in flood  
18 zones. Therefore, the proposed pipe replacement in the Company’s flood zone areas might  
19 not ensure the desired objective of minimizing or eliminating customer outages. The  
20 Company has not provided any specific analysis in this area.

21 **Q. WHAT ARE YOUR RECOMMENDATIONS REGARDING THE COMPANY’S**  
22 **PROPOSAL TO RAISE ITS M&R FACILITIES?**

# PUBLIC VERSION

1 A. Regarding the Company's M&R stations, I recommend that only the stations that have  
2 actually flooded during the recent storms should be raised above the flood level. Other M&R  
3 facilities that are proposed for similar raising solely because they are below the current 100-year  
4 flood level, should not be raised – at least not at this time or as part of this proposal. Improvements  
5 in the gas system at these facilities should continue as in past years, with incremental  
6 improvements and repairs being made as necessary and appropriate. As further experience is  
7 gained at the time of future storms, further analysis of more comprehensive enhancements such as  
8 raising the facilities or equipment can be made, depending on the extent of flooding encountered,  
9 if any.

10 **Q. DOES THIS CONCLUDE YOUR TESTIMONY FILED ON OCTOBER 28, 2013?**

11 A. Yes. However, I reserve the right to supplement my testimony if any updated or additional  
12 information becomes available during the course of this proceeding. I also reserve the right to  
13 supplement my testimony after further and more detailed review of any late-filed discovery  
14 responses as well as the recently filed Brattle Group Report in response to RCR-ECON-5 (Supp'l).

# **CREDENTIALS/ATTACHMENT I**

**CREDENTIALS OF EDWARD A. McGEE**

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**PROFESSIONAL CAREER**

2012 – present      **Acadian Consulting Group**  
Engineering Associate

As Engineering Associate for Acadian Consulting Group, I am responsible for assisting in studies performed for Public Utility Commissions.

1999 – present      **McGee Consulting**  
Principal Consultant and Engineer – Energy Industry

As Principal Consultant and Engineer, I am responsible for assisting larger consulting firms in their studies performed for utility companies and Public Utility Commissions.

1985 - 1999      **Stone & Webster Management Consultants, Inc.**  
Vice President/Director

As Vice President of Stone & Webster Management Consultants, I was responsible for consulting studies in the Gas Practice area, where I performed consulting analyses in the gas planning and gas operations areas for gas utility companies and public utility commissions.

1982 - 1985      **Stone & Webster Engineering Corporation**  
Business Development Manager

As Business Development Manager at Stone & Webster Engineering Corp., I was responsible for the construction of investment models for feasibility studies on large-scale chemical and refining complexes.

1982 & earlier      **W. R. Grace & Co.**  
Director of Energy Resources  
Manager of Chemical Development

As Director of Energy Resources for W. R. Grace, I advised the Chief Operating Officer on corporate energy consumption and production. I also assisted operating divisions in securing long-term energy resources.

As Manager of Chemical Development at W. R. Grace, I analyzed potential acquisition targets in specialty chemical and high technology fields, developing corporate strategies for selected expansions.

## **AMOCO Oil**

Supervisor of Technical Computer Programming  
Internal Operations Research Consultant

In a variety of engineering and computer modeling capacities at AMOCO Oil directed a staff of professionals in the development of technical programs in the refining, distribution and marketing areas.

## **EDUCATION**

**University of Chicago**, Master of Business Administration, Quantitative Analysis and Computers

**University of Notre Dame**, Master of Science in Chemical Engineering

**University of Notre Dame**, Bachelor of Science in Chemical Engineering

## **LICENSES & CERTIFICATES**

Licensed Professional Engineer -- State of Indiana  
U.S. Patent Holder -- Refinery Treating Process

## **PROFESSIONAL AFFILIATIONS**

American Institute of Chemical Engineers  
The Institute of Management Sciences

## **SAMPLE PUBLICATIONS AND PAPERS**

"Using a Personal Computer as a Gas Supply Planning Tool." Gas Industries lead article.

"Personal Computers and the Natural Gas Industry." Public Utilities Fortnightly.

"Personal Computer-Based Long-Range Planning for Natural Gas Development and Supply Management." Presented at the International Gas Union's 18th World Gas Conference, Berlin, Germany.



"Role of Optimization Models in Dispatching Gas Supplies." Presented at AGA Distribution/Transmission Conference, Toronto, Canada.

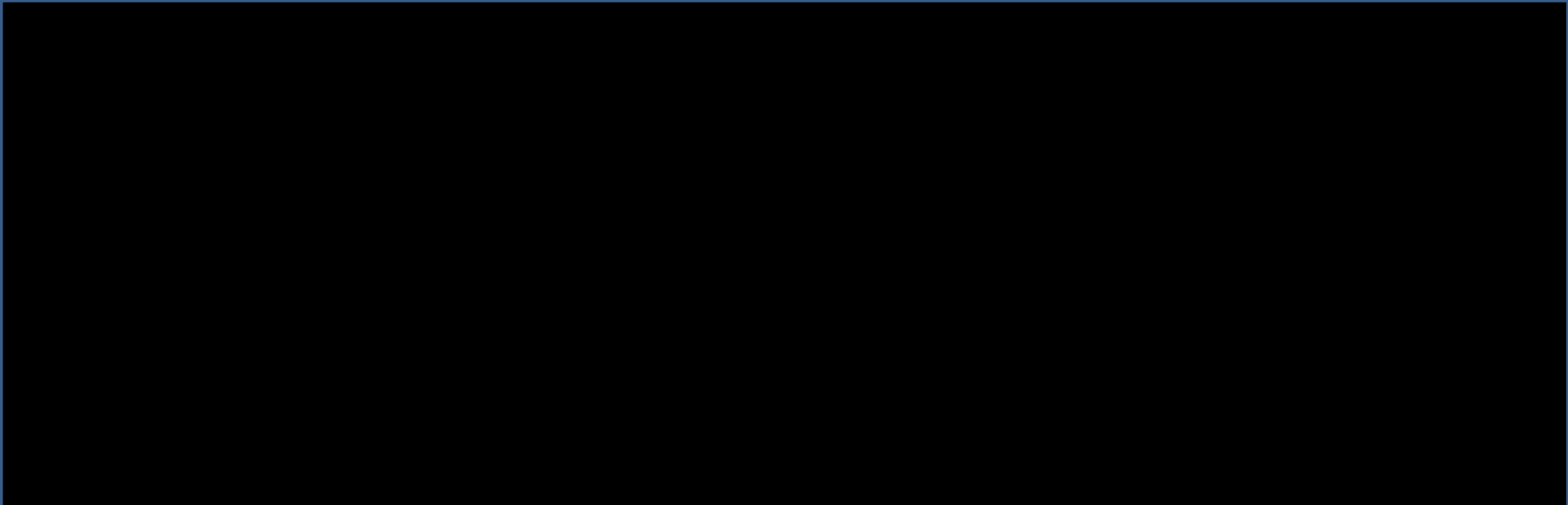
"Experience With Gas Supply Optimization Models at Inland Natural Gas." Presented at IGT symposium on Personal Computers in the Gas Industry, Chicago, Illinois.

# **SCHEDULES EAM-1 through EAM-6**

# Estimated Leak Reduction in Leak Rates after Replacement with Modern Materials

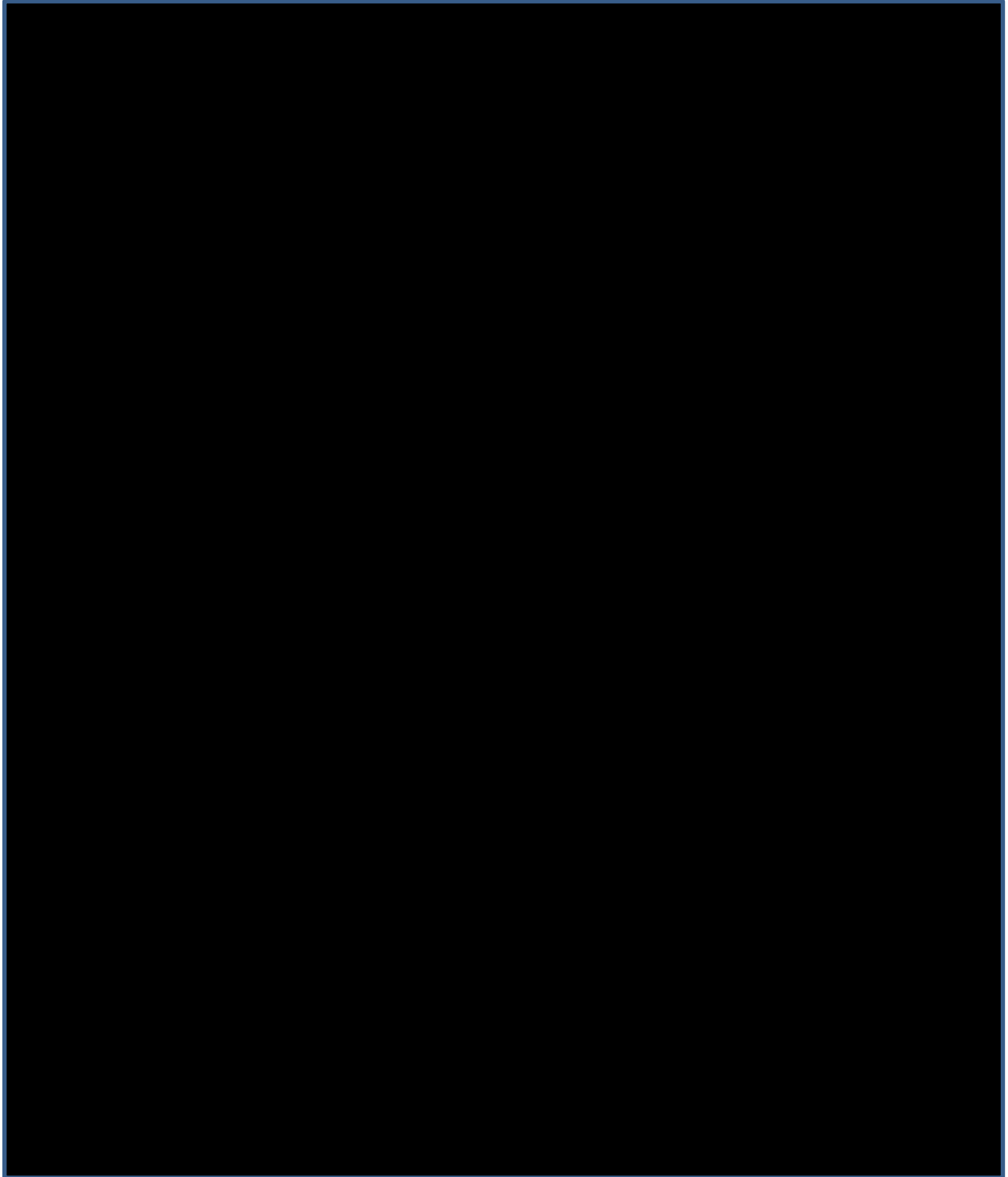


# Estimated Leak Reduction in Leak Rates after Replacement with Modern Materials



**PUBLIC VERSION**

Schedule EAM-2  
Page 1 of 2





Source: Company's Response to RCR-G-POL-11.

## Yearly Instances of Water Removal from UP System

Year	Storm (If Applicable)	Yearly Water Removal		
		Number of Instances <sup>1</sup>	Variance from Avg.	% Variance from Avg.
2006		900	(141)	-14%
2007		1,139	98	9%
2008		787	(254)	-24%
2009		816	(225)	-22%
<b>2010</b>	<b>2010 Nor'easter</b>	<b>958</b>	<b>(83)</b>	<b>-8%</b>
<b>2011</b>	<b>Hurricane Irene/T.S. Lee</b>	<b>1,578</b>	<b>537</b>	<b>52%</b>
<b>2012</b>	<b>Superstorm Sandy</b>	<b>1,109</b>	<b>68</b>	<b>7%</b>
7-Yr. Total		7,287		
Avg. per Yr.		1,041	-	0%

<sup>1</sup>Number of instances when personnel responded to a specific location to pump a gas main drip or to clear a gas main or service due to water infiltration.

Source: Company's Response to RCR-G-POL-45.

# Yearly Construction Hours Required for Water Removal from UP System

Year	Storm (If Applicable)	Yearly Water Removal		
		Total Hours <sup>1</sup>	Variance from Avg.	% Variance from Avg.
2006		7,899	(4,811)	-38%
2007		14,992	2,282	18%
2008		10,351	(2,359)	-19%
2009		12,421	(289)	-2%
<b>2010</b>	<b>2010 Nor'easter</b>	<b>14,467</b>	<b>1,757</b>	<b>14%</b>
<b>2011</b>	<b>Hurricane Irene/T.S. Lee</b>	<b>20,080</b>	<b>7,370</b>	<b>58%</b>
<b>2012</b>	<b>Superstorm Sandy</b>	<b>8,757</b>	<b>(3,953)</b>	<b>-31%</b>
7-Yr. Total		88,967		
Avg. per Yr.		12,710	-	0%

<sup>1</sup>Total construction hours to perform drip pumping and to clear mains and services of water infiltration.  
Source: Company's Response to RCR-G-POL-45.



<b>Number Of Customers Without Gas Service During Recent Storms</b>		
<b>Year</b>	<b>Storm</b>	<b>Number of Customer Outages</b>
2010	2010 Nor'easter	45
2011	Hurricane Irene	1,392
2012	Superstorm Sandy	1,133

# Estimated Percent of PSE&G Customers without Gas Service During 3 Most Recent Storms<sup>1</sup>

Storm	Town	Number of Customers Without Gas Service	Population in Each Town <sup>2</sup>	Estimated Number of Customers in Each Town <sup>3</sup>	% of Customers Without Gas Service
<u>Superstorm Sandy</u>	Hoboken City	80	50,005	9,329	0.9%
	Jersey City	530	247,597	46,193	1.1%
	Little Ferry Boro	125	10,626	1,982	6.3%
	Lyndhurst Twp	100	20,554	3,835	2.6%
	Madison	9	15,845	2,956	0.3%
	Plainfield City	3	49,808	9,293	0.0%
	Sayreville Boro	162	42,704	7,967	2.0%
	South Amboy City	8	8,631	1,610	0.5%
	South River	41	16,008	2,987	1.4%
	Wallington Boro	75	11,335	2,115	3.5%
	<b>Total Sandy</b>	<b>1,133</b>		<b>88,267</b>	<b>1.3%</b>
<u>Hurricane Irene</u>	Emerson Boro	26	7,401	1,381	1.9%
	Fairlawn	50	32,457	6,055	0.8%
	Little Falls Twp	70	14,432	2,693	2.6%
	Lyndhurst Twp	100	20,554	3,835	2.6%
	Madison	5	15,845	2,956	0.2%
	Newark City	100	277,140	51,705	0.2%
	Paterson City	250	146,199	27,276	0.9%
	Rochelle Park	100	5,530	1,032	9.7%
	Rutherford Boro	30	18,061	3,370	0.9%
	Somerville Boro	11	12,098	2,257	0.5%
	Springfield	100	15,817	2,951	3.4%
	Totowa Boro	300	10,804	2,016	14.9%
	Wallington Boro	200	11,335	2,115	9.5%
	West Paterson Boro	50	11,819	2,205	2.3%
	<b>Total Irene</b>	<b>1,392</b>		<b>111,846</b>	<b>1.2%</b>
<u>2010 Nor'easter</u>	Irvington	44	53,926	10,061	0.4%
	Mount Holly	1	9,536	1,779	0.1%
	<b>Total Nor'easter</b>	<b>45</b>		<b>11,840</b>	<b>0.4%</b>

<sup>1</sup>Percentage of households having gas service estimated at 50%. Per EIA 2009 U.S. average. (<http://www.eia.gov/tools/faqs/faq.cfm?id=49&t=8>).

<sup>2</sup>Census 2010.

<sup>3</sup>Number of Company residential gas customers in each town estimated as average household size of 2.68 per household in 2000 census in New Jersey. (<http://lwd.dol.state.nj.us/labor/lpa/census/2kpub/njsdcph1.pdf>)

Source: Company's Response to RCR-G-POL-22.