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2
3 **Direct Testimony**
4 **of**
5 **Charles F. Dippo, PE**
6 **Vice President, Engineering Services & System Integrity**
7 **South Jersey Gas Company**
8 **January 2010**
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11
12 **I. Introduction**

13
14 My name is Charles F. Dippo, and my business address is 1 South Jersey Plaza, Folsom,
15 New Jersey 08037. I am Vice President, Engineering Services & System Integrity for South
16 Jersey Gas Company (“South Jersey” or the “Company”). In this position, I am responsible for
17 managing and directing all engineering services and related planning activities involving the
18 design and technical specifications of pipeline operations, LNG peak shaving facilities, gas
19 supply & gas control allocations, and the construction of the Company’s transmission and
20 distribution infrastructure.

21 I am a 1979 graduate of Lehigh University with a Bachelor of Science degree in Civil
22 Engineering. I also hold a Master of Science degree in Engineering Management from Drexel
23 University. I have been employed by South Jersey for over 30 years and have held various
24 supervisory positions of increasing responsible charge in the operations and engineering areas of
25 the Company. These positions have included Construction Supervisor, Senior Engineer, General
26 Manager, and Director of Engineering Services. In 1998, I was elected Assistant Vice President
27 of Engineering Services followed by promotion to Vice President, Engineering Services in 2001.
28 I have held my current title of Vice President, Engineering Services & System Integrity since

1 early 2003. I am a licensed Professional Engineer in the State of New Jersey, a Certified Gas
2 Engineer by the American Society of Gas Engineers, a past President of the Society of Gas
3 Operators (2007-08), and I am the present Vice-Chair of the Executive Committee of the
4 American Gas Association's Operating Section.

5 **II. Purpose of Testimony**

6 The purpose of this testimony is to provide an overview of certain post-test year capital
7 construction costs that South Jersey intends to include in rate base. In connection with the post-
8 test year construction expenditures, I also discuss the Company's Capital Investment Recovery
9 Tracker ("CIRT") projects, both approved and proposed. Those CIRT projects which have
10 received Board approval will be rolled into rate base as permitted in the CIRT proceeding, while
11 the proposed, but not yet approved, CIRT projects are currently included in South Jersey's post-
12 test year capital expenditure adjustment. Should any of the proposed projects be approved by the
13 Board under the CIRT, then they will be removed from the Company's post-test year
14 construction adjustment calculation.

15 Additionally, I discuss the efforts that South Jersey has taken to comply with the
16 transmission pipeline integrity management ("PIM") regulations and the recent (December
17 2009) regulatory requirement for the Company to establish a Distribution Integrity Management
18 Program (DIMP)(together we refer to these programs as "IM"). South Jersey is requesting that
19 the incremental Operating and Maintenance (O&M) expenses incurred as a result of complying
20 with the IM regulations be recovered through a Reliability Tracker, as described in greater detail
21 in the testimony of Mr. Pignatelli.

22 Finally, South Jersey intends to implement an accelerated main replacement program
23 (AMRP), which will significantly accelerate the pace of South Jersey's replacement of its
24 unprotected, bare and coated steel mains and services, and cast iron mains. As with the IM

1 expenditures, expenses related to the AMRP will be recovered through the Reliability Tracker.
2 The AMRP will not only preserve or create hundreds of direct and indirect jobs each year for the
3 foreseeable future, but it will also significantly reduce the annual greenhouse gas (GHG)
4 emissions resulting from fugitive methane leakage associated with older bare steel mains and
5 services, and cast iron piping systems. As part of this initiative, South Jersey will propose to
6 monetize voluntary emission reduction credits for the GHG reductions, which in turn will offset
7 costs by creating an additional revenue source to benefit South Jersey's ratepayers.

8 **III. Post-Test Year Construction**

9 South Jersey is proposing to include in rate base, capital expenditures associated with
10 post-test year construction projects which are known and measurable, consistent with Board
11 precedent, including *In Re Elizabethtown Water Company Rate Case*, BPU Docket No.
12 WR8504330 (May 23, 1985). Mr. Fatzinger has testified as to post-test year plant which is not
13 related to Transmission and Production facilities. My testimony and schedules relate to post-test
14 year Transmission and Production Plant. The proposed post-test year capital expenditures
15 identified in Schedule CFD-1, are each "prudent and major in nature and consequence" and
16 therefore should be included in rate base. These projects represent significant investments South
17 Jersey is making, which constitute major infrastructure replacement, improvement or system
18 expansion upgrades. These projects include:

- 19 • Significant replacement upgrades to existing utility plant facilities:
 - 20 ➤ Transmission Valve Upgrades
 - 21 ➤ Wildwood Regulator Station
 - 22 ➤ LNG Plant Generator
 - 23 ➤ Woodbine Regulators

- 1 ➤ Deepwater Station
- 2 ➤ Burleigh Station
- 3 ➤ Beckett Station
- 4 ➤ Harmony Road Scrubber Piping
- 5 ➤ LNG Tank Foundation Heater
- 6 ➤ Mickelton Station
- 7 • Significant improvement upgrades to existing utility plant facilities:
 - 8 ➤ Swedesboro Station Upgrade
 - 9 ➤ 12” Rio Grande-Wildwood Pipeline
 - 10 ➤ 20” Union Road-Route 50 Upgrade
 - 11 ➤ 12” Atco-Stokes Road Pipeline
 - 12 ➤ LNG Pump Skid
 - 13 ➤ Hardingville Station
 - 14 ➤ 8” PP Main – Route 538
 - 15 ➤ 16” CMCH–Burleigh Pipeline
 - 16 ➤ LNG Vaporizer
 - 17 ➤ Upgrade Ocean Heights Avenue
- 18 • And significant new facility or system expansion upgrades:
 - 19 ➤ 24” Malaga-Vineland Pipeline
 - 20 ➤ Union Road Station
 - 21 ➤ Malaga Station Heater
 - 22 ➤ 24” Black Horse Pike-Delilah Road Pipeline
 - 23 ➤ Patcong Creek Regulators

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1 The post-test year adjustment in the initial filing is based upon a projection of capital
2 expenditures to be made by the Company during the period July 1, 2010 through December 31,
3 2010. These expenditures, summarized in Schedule CFD-1, were projected in the Company's
4 budget process and are currently approved by the Company's Board of Directors. I am using the
5 amount of \$24.6 million contained in Schedule CFD-1 as a surrogate for the actual adjustment.
6 More precise numbers will be provided in conjunction with the 12-month update, as we get
7 closer to the construction dates.

8 As described below, each of these projects are "prudent and major in nature and
9 consequence." I am responsible for reviewing each of these projects, and I can personally attest
10 that each of them will allow South Jersey to continue to render safe, adequate, and proper
11 service. Investment in each of these projects is therefore, prudent. Moreover, the cost for each
12 project is reasonable. South Jersey's estimated costs for these projects have been determined
13 using engineering design and costing methods. These estimated project costs serve as the basis
14 for the capital expenditures projected to be made by the Company during the post-test year
15 period. These estimates of capital expenditures were prepared for the Company's annual budget
16 process and are currently approved by the Company's Board of Directors.

17 Moreover, South Jersey engages in negotiating and bidding procedures which ensure that
18 our construction costs are kept to a minimum, consistent with generally accepted engineering and
19 construction practices. Under certain circumstances, South Jersey solicits bids from prospective
20 contractors on a specific project scope basis. In other circumstances, the Company solicits
21 proposals on a blanket contract basis. In this way, South Jersey retains the contracting flexibility
22 needed to optimize the expenditure of capital dollars while maintaining control of the project
23 construction timeframe requirements.

1 Schedule CFD-1, describes \$24.6 million in post-test year project costs that I am
2 using for filing purposes. The post-test year construction yields an adjustment of \$24.6 million,
3 which is reflected as a pro forma adjustment in Schedule SAP-2 of Mr. Pignatelli's testimony.
4 The Company's recovery of a return on and a return of these post-test year investments is well
5 justified. South Jersey has planned significant capital investments which are known and
6 measurable, and major in nature and consequence. The post-test year adjustments delineated on
7 Schedule CFD-1 include approved CIRT projects, proposed CIRT projects, and "traditional"
8 budgeted capital expenditures (non-CIRT projects). Schedule CFD-1, in addition to delineating
9 the test year and post-test year construction expenditures addressed in this section of my
10 testimony, also provides the projected in-service dates for both the approved and proposed CIRT
11 projects discussed in the next sections of my testimony.

12 **A. Post-Test year Capital Project Expenditures through December 2010**

13 As provided on Schedule CFD-1, there are six approved CIRT projects which are
14 projected to be placed in-service by December 31, 2010. These projects are scheduled to incur
15 expenditures during the July 2010 through December 2010 post-test year period. Preliminary
16 engineering is in progress for each of these approved projects which includes route selection,
17 surveying, pipeline alignment design and environmental permitting for the five pipeline
18 facilities, and engineering design associated with the LNG vaporizer unit. Consistent with South
19 Jersey's CIRT proceeding, each of the six approved CIRT projects will be rolled into rate base.
20 South Jersey fully believes that each project is reasonable and prudent, and therefore warrants
21 inclusion in rate base. The six approved CIRT projects and corresponding expenditures and the
22 projected 'traditional' non-CIRT capital expenditures are as follows:

23

| <u>Project</u> | <u>Length(miles)</u> | <u>Estimated Cost</u> |
|---|----------------------|-----------------------|
| 1. 20" Union Rd.- Rt. 50 Upgrade | 10 | \$ 853,103 |
| 2. 12" Atco-Stokes Rd. Pipeline | 6 | \$ 8,475,121 |
| 3. 16" CMCH-Burleigh Pipeline | 3 | \$ 7,160,640 |
| 4. Burleigh Station | - | \$ 398,359 |
| 5. 24" Black Horse-Delilah Rd. Pipeline | 3 | \$ 7,653,414 |
| 6. LNG Vaporizer H-6 | - | \$ 4,993,683 |
| 7. Non-CIRT Capital Expenditures | - | \$2,917,721 |
| | Total | \$ 32,452,041 |

In addition to the above referenced approved CIRT projects shown on Schedule CFD-1, the Company has proposed six incremental Engineering CIRT projects for 2010 as part of its Annual CIRT Filing made on November 6, 2009. The Board has not yet determined whether to include these projects within the CIRT program. Consistent with the CIRT proceeding, to the extent each of these projects obtains CIRT approval by the Board, South Jersey is proposing to roll each qualifying project into rate base. These projects will be placed into service by December 31, 2010, with expenditures incurred during the July 1, 2010 – December 31, 2010 post-test year period. The additional CIRT projects proposed for 2010 are as follows:

| <u>Project</u> | <u>Length(miles)</u> | <u>Estimated Cost</u> |
|--------------------------|----------------------|-----------------------|
| 1. Woodbine Regulators | - | \$ 200,463 |
| 2. Malaga Station Heater | - | \$ 500,055 |
| 3. LNG Pump Skid | - | \$ 3,750,000 |
| 4. Hardingville Station | - | \$ 500,051 |
| 5. Deepwater Station | - | \$ 251,231 |

| | | | |
|---|---------------------------|--------------|---------------------|
| 1 | 6. 8" PP Main – Route 538 | - | \$ 250,303 |
| 2 | | Total | \$ 5,452,103 |

3 South Jersey has proposed to include these projects in the Company’s post-test year capital
4 expenditures in this case. However, if these projects are approved by the Board in the previously
5 mentioned CIRT proceeding, then South Jersey will remove them from the post-test year
6 adjustment in this case.

7
8 **B. CIRT Projects Proposed to Be Placed In-Service During 2011**

9 As also listed on Schedule CFD-1, the Company has proposed the following additional
10 six CIRT projects which are scheduled to be placed in-service during 2011. These projects are:

| 11 | <u>Project</u> | <u>Length(miles)</u> | <u>Estimated Cost</u> | <u>In-Service</u> |
|----|-------------------------------|----------------------|-----------------------|-------------------|
| 12 | 1. Beckett Station | - | \$ 200,000 | Oct 2011 |
| 13 | 2. Harmony Rd Scrubber Piping | - | \$ 300,000 | Oct 2011 |
| 14 | 3. Uprate Ocean Heights Ave | 4 | \$ 250,000 | Nov 2011 |
| 15 | 4. LNG Tank Heater & Sump | - | \$ 675,000 | Nov 2011 |
| 16 | 5. Patcong Creek Regulators | - | \$ 250,000 | Nov 2011 |
| 17 | 6. Mickelton Station | - | \$ 190,000 | Nov 2011 |
| 18 | | Total | \$1,865,000 | |

19 Similarly, South Jersey has proposed to include these projects in the Company’s post-test year
20 capital expenditures in this case. However, if these projects are approved by the Board in the
21 previously mentioned CIRT proceeding, then South Jersey will remove them from the post test
22 year adjustment in this case.

23
24

1 **IV. Pipeline Integrity Management and Distribution Integrity Management**

2 South Jersey has maintained compliance with the Federal pipeline safety regulations on
3 pipeline integrity as found at 49 CFR 192 - Subpart O since these regulations went into effect in
4 December of 2003. As of December 31, 2009, South Jersey operates 107 miles of transmission
5 pipeline which are subject to the PIM regulations. Achieving compliance with the regulations
6 required the development and subsequent implementation of an integrity management program
7 for the specific transmission pipelines covered under this part. This detailed and comprehensive
8 South Jersey program includes:

- 9 • an ongoing identification of “high consequence areas” to delineate covered pipeline
10 segments;
- 11 • the development of a baseline assessment plan;
- 12 • data integration and risk assessment to determine the how to address each covered
13 pipeline segment; and
- 14 • the selection and implementation of a baseline integrity assessment technique which
15 addresses the specific risks associated with each covered pipeline segment.

16 South Jersey has successfully met the first regulatory deadline established for the initial baseline
17 integrity assessments, which required the assessment of certain covered segments of the
18 Company’s transmission system by December 17, 2007. South Jersey is presently focused on
19 meeting the similar requirement for completing the initial baseline integrity assessments on its
20 remaining covered facilities prior to the December 17, 2012 deadline.

21 The Company has incurred both capital upgrade expenditures and incremental operating
22 and maintenance (O&M) expenses associated with complying with the pipeline integrity
23 management regulations. The capital upgrades have included expenditures associated with

1 physical piping replacements, valve change outs, and station piping retrofits to accommodate in-
2 line inspection tools. The incremental O&M expenses have included expenditures such as the
3 consulting and inspection fees associated with running the in-line inspection tools, and the costs
4 of performing confirmatory field excavations on the pipe to remediate or repair any identified
5 anomalies. The additional capital expenditures have been absorbed by the Company in its annual
6 capital construction budget each year as incurred. The incremental O&M expenses associated
7 with complying with the pipeline integrity management regulations have been treated as a
8 deferred expense by the Company for the years 2006 to 2009. As of November 30, 2009, these
9 deferred expenses totaled \$ 1,174,755. As more pipeline segments have integrity assessments
10 performed, these costs will continue to accrue, and their magnitude will be directly related to the
11 findings associated with the results of each assessment.

12 On December 4, 2009, the Department of Transportation–Pipeline and Hazardous
13 Materials Safety Administration (PHMSA) published the final rule on Integrity Management for
14 Gas Distribution Pipelines which is applicable to gas distribution operators such as South Jersey,
15 and becomes effective February 2, 2010. The compliance deadline for each operator to develop a
16 written DIMP plan is August 2, 2011. Each operator’s DIMP plan is to be comprehensive,
17 system specific, and must include, among other elements:

- 18 • knowledge of the overall gas distribution system;
- 19 • identification of system specific concerns;
- 20 • evaluation and ranking of the system concerns by geographic areas or distribution sections;
- 21 • identification of steps to address any identified concerns;
- 22 • measurement, monitoring and evaluation of the DIMP through mandated metrics tracking;
- 23 • periodic evaluation of the DIMP; and

- annual performance measures reporting and filing.

Since both the results of future assessments under the PIM program and the cost of compliance with the DIMP regulations are unknown at this time, South Jersey proposes that these incremental compliance expenditures, including existing deferrals, be captured in the proposed Reliability Tracker as described further in Mr. Pignatelli's testimony.

V. Proposed Accelerated Main Replacement Program (AMRP)

South Jersey is committed to doing its part to improve New Jersey's economic well being through continued job creation and to reduce greenhouse gas (GHG) emissions associated with fugitive methane emissions common in natural gas delivery systems. To accomplish both of these goals, South Jersey seeks to accelerate the pace of replacement of older mains and services. Doing so will help create or preserve between 125-150 construction jobs directly created by South Jersey's CIRT implementation, and will significantly reduce fugitive methane emissions from South Jersey's distribution system by as many as 16,660 metric tons over the first 10 years of the AMRP's implementation. As methane has 21 times the global warming potential of carbon dioxide (CO₂), this is equivalent to approximately 350,000 mtCO₂e (metric tons of CO₂ equivalents) being offset over 10 years, or the removal of roughly 90,000 cars and trucks from New Jersey's highways. Additionally, South Jersey's proposal will have a multiplier effect on the creation or preservation of ancillary and indirect jobs in the construction and related industries to service the AMRP. Using estimates of total jobs created per dollar of capital investment, as provided by the Associated General Contractors of America, would result in approximately 656 jobs in the first year of the program. Toward this end, South Jersey proposes to implement an AMRP to increase the rate at which it replaces its unprotected bare and coated steel mains and services and its cast iron mains.

1 Under the proposed AMRP, South Jersey would more than double its pre-CIRT replacement
2 rate, which would reduce the time to complete the replacement of mains from approximately 46
3 years (at the pre-CIRT replacement rate) to 20 years, and the replacement of services from
4 approximately 16 years to 10 years. Implementation of the AMRP will maintain for the
5 foreseeable future jobs created by South Jersey's CIRT projects, reduce GHG emissions from
6 fugitive methane and accelerate South Jersey's system upgrade, which can only improve the
7 already reliable and efficient system. The AMRP is consistent with New Jersey's significant
8 efforts to stimulate job creation, while also adding to the State's goal to reduce GHG
9 emissions—a win-win scenario for all involved. The AMRP may also allow South Jersey to
10 generate additional revenue to the benefit of its ratepayers by amassing voluntary emission
11 reduction credits from the reduction in GHG emissions.

12 The AMRP would apply to South Jersey's:

- 13 • unprotected bare and coated steel mains;
- 14 • unprotected bare and coated steel services; and
- 15 • cast iron mains.

16 As of December 31, 2008 South Jersey had in service:

- 17 • 1,078 miles of unprotected bare steel main and 38,291 unprotected bare steel services;
- 18 • 35 miles of unprotected coated steel main and 6,620 unprotected coated steel services;
- 19 • 5 miles of protected bare steel main in service and 221 protected bare steel services; and
- 20 • 259 miles of cast iron mains.

21 The AMRP would be implemented following the completion of approved CIRT projects. As
22 identified in Schedule CFD-2, under the AMRP approximately 62 miles of mains would be
23 replaced yearly, and approximately 4,102 services would be replaced yearly. The main

1 replacement costs per foot are estimated to increase over time, starting at \$48.00 per foot in 2011
2 and increasing to \$89.88 dollars per foot in 2030, the last year of main replacement under the
3 AMRP. The replacement cost per service is projected to be \$2,100.00 per service in 2011,
4 increasing to \$2,926.24 per service in 2020. Schedule CFD-2 presents replacement cost data by
5 year and cumulatively. The total replacement costs for mains over the life of the AMRP is
6 currently projected to be \$445,205,011 and for services \$102,355,428. These costs are based on
7 current contracted rates from 2011 through 2015, and projected contracted rates from 2016
8 through 2030.

9 **A. Jobs**

10 Under the AMRP South Jersey's construction requirements will maintain the need for
11 between 125-150 jobs created to implement South Jersey's approved CIRT projects. As noted
12 by the Governor's office, the Association of General Contractors of America (AGC) estimates
13 the creation of an additional 28,500 jobs for every \$1 billion in infrastructure spending.¹ South
14 Jersey's AMRP expenditures are projected to range from \$22,549,888 to \$33,896,548 per year,
15 which based on the AGC estimates, translates to between 642 and 966 total jobs per year. Thus,
16 in addition to the 125-150 direct construction jobs, approval of the AMRP will create or
17 preserve, between 492 and 841 ancillary or indirect jobs each year that the AMRP is ongoing.

18 Once the CIRT projects are completed, and if there are no additional projects that require
19 these jobs, there is no guarantee that South Jersey will have a need to retain the contractors
20 providing these job opportunities. Currently, South Jersey projects that approval of the AMRP
21 will continue the need for these construction and related ancillary jobs indefinitely, maintaining
22 the direct and indirect net employment benefit created under the CIRT.

¹ See January 22, 2009 Testimony of Stephen S. Fuller, PhD, Dwight Schar Faculty Chair, George Mason University, on behalf of the Associated General Contractors of America before the U.S. House of Representatives Committee on Transportation and Infrastructure.

1 The positive benefits of the AMRP for the improved economic well being of New Jersey
2 will be significant. The prolonged job retention beyond the expiration of the CIRT will assist in
3 any economic recovery being felt by New Jersey, which is vital to the economy in South Jersey's
4 service territory.

5 **B. GHG Emission Reductions**

6 In addition to the significant job creation benefits that the AMRP will create, the AMRP:
7 (i) will reduce GHG emissions, (ii) further the State's goals under the Global Warming Response
8 Act and the New Jersey Energy Master Plan, and (iii) may generate revenue from voluntary
9 emission reduction credits that would be returned to the Company's customers through the
10 Reliability Tracker. In accelerating its replacement program, South Jersey will be greatly
11 assisting New Jersey to achieve its GHG emission reduction goals, to the benefit of all of South
12 Jersey's customers and all residents of the State. South Jersey's statements in its CIRT petition
13 are equally applicable here:

14 [T]he [CIRT Projects] are being completed to enhance and accelerate the replacement of
15 bare steel mains, thereby reducing leaks, and associated greenhouse gas emissions.

16 *****

17
18 In addition to improving South Jersey's system for the benefit of our customers and
19 reducing greenhouse gas emissions, South Jersey's proposed, accelerated infrastructure
20 program is expected to provide significant economic benefits for the State of New Jersey
21 through the creation of jobs and an increase in spending for goods and services.
22

23 See Petition, Paragraphs 22 and 33.

24 **1. Methane Is a Greenhouse Gas**

25 Climate change represents a serious challenge for virtually all industry sectors –
26 particularly those dealing with energy generation and distribution. Natural gas is composed of
27 about 93% methane, which is an extremely potent GHG with 21 times the global warming

1 potential of carbon dioxide (CO₂). On December 7, 2009, the U.S. Environmental Protection
2 Agency (EPA) determined that when released to the atmosphere GHGs threaten the public health
3 and welfare of the American people.² The EPA’s endangerment determination implements the
4 2007 U.S. Supreme Court decision, *Massachusetts v. Environmental Protection Agency*,³ which
5 declared CO₂ and other GHGs to be “pollutants” under the Clean Air Act, which EPA must
6 regulate if found to endanger public health and the environment. EPA found that CO₂, methane,
7 and four other GHGs (nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur
8 hexafluoride) are the primary drivers of climate change. EPA concluded that the continued
9 uncontrolled release of these GHGs can lead to hotter, longer heat waves that threaten the health
10 of the sick, poor or elderly; increase ground-level ozone pollution linked to asthma and other
11 respiratory illnesses; as well as other threats to the health and welfare of current and future
12 generations of Americans. EPA’s endangerment determination concluded that GHG
13 concentrations in the atmosphere are at record high levels and that the Earth has been warming
14 over the past 100 years, with the steepest increase in warming in recent decades.

15 Concerning methane, in particular, EPA found that the global atmospheric concentration
16 has increased more than any other GHG, from a pre-industrial level of 715 parts per billion (ppb)
17 to 1782 ppb in 2007, a 149% increase. EPA further found that the evidence of human-induced
18 climate change goes beyond observed increases in average surface temperatures; it includes
19 melting ice in the Arctic, melting glaciers around the world, increasing ocean temperatures,

² See EPA, *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, December 7, 2009 <http://www.epa.gov/climatechange/endangerment/downloads/FinalFindings.pdf>; EPA, *Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act*, December 7, 2009, <http://www.epa.gov/climatechange/endangerment/downloads/Endangerment%20TSD.pdf>.

³ 127 S. Ct. 1438 (2007), *rev’g* 415 F.3d 50 (D.C. Cir. 2005).

1 rising sea levels, acidification of the oceans due to excess carbon dioxide, changing precipitation
2 patterns, and changing patterns of ecosystems and wildlife.

3 **2. Natural Gas Distribution Systems Are a Source of Fugitive Methane**
4 **Emissions**

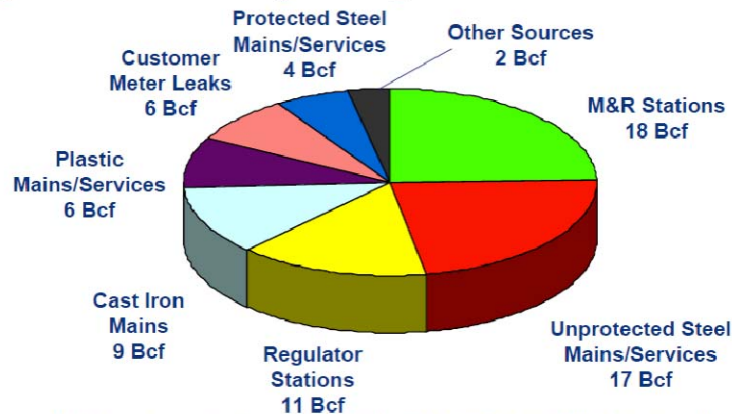
5 According to EPA and the New Jersey Department of Environmental Protection
6 (NJDEP), methane emissions occur in all sectors of the natural gas industry, from drilling and
7 production, through processing and transmission, to distribution. The last stage of the
8 transmission and distribution (“T&D”) piping system is the distribution system, which accepts
9 high-pressure gas from the interstate transmission system at “city gate” stations, reduces the
10 pressure and distributes the gas to individual end-users primarily through underground mains and
11 service lines. According to EPA, distribution mains account for approximately 28 percent of all
12 methane emissions from natural gas systems.⁴ A major source of methane emissions from the
13 distribution system (roughly 23%) is leaking older cast iron and unprotected steel distribution
14 pipes, as shown below.

⁴ EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007* (April 2009) at p. 3-44,
<http://www.epa.gov/climatechange/emissions/downloads09/GHG2007-03-508.pdf>



2007 Distribution Sector Methane Emissions

Majority of emissions from underground pipe leaks and fugitives from metering and regulator stations



EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2007*. April, 2009. Available on the web at: epa.gov/climatechange/emissions/usinventoryreport.html

3

In its 2007 GHG Emissions Inventory, the NJDEP found that New Jersey’s natural gas T&D system (of which the Company’s system is a part) released approximately 2.7 million metric tons (MMT) carbon dioxide equivalents (CO₂-e), accounting for about 1.8% of all GHG emissions in the State.⁵ NJDEP further estimated that methane emissions from New Jersey’s natural gas T&D system will increase at an average annual rate of 0.45% from 2010-2015 and of 0.35% from 2015-2020, based on AEO2006 regional forecast in natural gas consumption for Middle Atlantic region.⁶

One of the primary reference documents for GHG emission factors from the natural gas distribution sector is a 1996 study prepared by Radian International on behalf of the EPA and the Gas Research Institute, titled *Methane Emissions from the Natural Gas Industry* (“EPA/GRI

⁵ See *New Jersey Statewide Greenhouse Gas Emissions Inventory Update: 2005, 2006, and 2007 Estimates*, <http://www.nj.gov/dep/oce/inventory-05-06-07.pdf>.

⁶ See *New Jersey Greenhouse Gas Inventory and Reference Case Projections 1990-2020* November 2008, Table 4. Key Sources for New Jersey Data, Inventory Methods, and Growth Rates.

1 Study”).⁷ The EPA/GRI Study derived emission and activity factors for buried unprotected steel
2 distribution mains, service lines, and other pieces of equipment. The study analyzed actual
3 methane measurements from 146 separate leak repairs reported by 10 natural gas distribution
4 companies. Unprotected bare steel distribution mains were found to have an average of 1.09
5 average leak repairs/mile of main, which yielded an average fugitive methane corrosion leak rate
6 of 4,652 pounds per mile per year. Unprotected bare steel service lines were found to have an
7 average of 0.027 average annual leak repairs/mile of service lines, which yielded an average
8 fugitive methane corrosion leak rate of 71.81 pounds per service per year.

9 The EPA/GRI Study is the basis for the American Gas Association’s recent guideline,
10 *Greenhouse Gas Emission Estimation Methodologies, Procedures, and Guidelines for the*
11 *Natural Gas Distribution Sector*⁸ (“AGA Guidelines”) and the United Nation’s Clean
12 Development Mechanism (CDM) Approved Methodology for generating Certified Emission
13 Reduction (“CER”) credits from natural gas distribution system accelerated main replacements
14 (“CDM Methodology”).⁹ Following is a table from the AGA Guidelines summarizing the
15 fugitive emission factors from the EPA/GRI Study for various types of natural gas distribution
16 piping.

⁷ See Methane Emissions from the Natural Gas Industry, Volume 9: Underground Pipelines, EPA-600/R-96-0801 (June 1996), Table 8-4, and Table <http://cdm.unfccc.int/UserManagement/FileStorage/QE6A6E735EZXXI3CB7YDVNVY2CY464>.

⁸ See AGA, *Greenhouse Gas Emission Estimation Methodologies, Procedures, and Guidelines for the Natural Gas Distribution Sector* (April 2008).

⁹ See United Nations Framework Convention on Climate Change, Clean Development Mechanism, *Approved Baseline and Monitoring Methodology AM0043, Leak Reduction From a Natural Gas Distribution Grid by Replacing Old Cast Iron Pipes or Steel Pipes Without Cathodic Protection with Polyethylene Pipes*, footnote 5, http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_CF8ZNUVP8A86TOUTNQTH9S6NJQW7J7

Table 5-3. Distribution Sector Tier 3 Emission Factors for Fugitive Emissions.^A

| Emission Source | Activity Data | GHG | Emission Factor | EF Units |
|------------------------------------|----------------|---------------------------|-------------------|---------------|
| Commercial/ Industrial Meters | Meter Count | CH ₄ | 2.022 | lb/meter-yr |
| Residential Customer Meters | Meter Count | CH ₄ | 5.847 | lb/meter-yr |
| M&R Stations | Station Count | CH ₄ | Refer to Tale 5-4 | |
| Cast Iron Pipeline Main | Main Length | CH ₄ | 10,079 | lb/mile-yr |
| Cast Iron Pipeline Main | Main Length | Leak CO ₂ | 994.2 | lb/mile-yr |
| Cast Iron Pipeline Main | Main Length | Oxidation CO ₂ | 18,710 | lb/mile-yr |
| Plastic Pipeline Main | Main Length | CH ₄ | 693.0 | lb/mile-yr |
| Plastic Pipeline Main | Main Length | Leak CO ₂ | 41.64 | lb/mile-yr |
| Plastic Pipeline Main | Main Length | Oxidation CO ₂ | 38.89 | lb/mile-yr |
| Protected Steel Pipeline Main | Main Length | CH ₄ | 129.5 | lb/mile-yr |
| Protected Steel Pipeline Main | Main Length | Leak CO ₂ | 7.862 | lb/mile-yr |
| Protected Steel Pipeline Main | Main Length | Oxidation CO ₂ | 11.01 | lb/mile-yr |
| Unprotected Steel Pipeline Main | Main Length | CH ₄ | 4,652 | lb/mile-yr |
| Unprotected Steel Pipeline Main | Main Length | Leak CO ₂ | 278.9 | lb/mile-yr |
| Unprotected Steel Pipeline Main | Main Length | Oxidation CO ₂ | 234.5 | lb/mile-yr |
| Copper Pipeline Service | Services Count | CH ₄ | 10.74 | lb/service-yr |
| Copper Pipeline Service | Services Count | Leak CO ₂ | 0.6322 | lb/service-yr |
| Copper Pipeline Service | Services Count | Oxidation CO ₂ | 0.0 | lb/service-yr |
| Plastic Pipeline Service | Services Count | CH ₄ | 0.3926 | lb/service-yr |
| Plastic Pipeline Service | Services Count | Leak CO ₂ | 0.0293 | lb/service-yr |
| Plastic Pipeline Service | Services Count | Oxidation CO ₂ | 0.2905 | lb/service-yr |
| Protected Steel Pipeline Service | Services Count | CH ₄ | 7.451 | lb/service-yr |
| Protected Steel Pipeline Service | Services Count | Leak CO ₂ | 0.4505 | lb/service-yr |
| Protected Steel Pipeline Service | Services Count | Oxidation CO ₂ | 0.5470 | lb/service-yr |
| Unprotected Steel Pipeline Service | Services Count | CH ₄ | 71.81 | lb/service-yr |
| Unprotected Steel Pipeline Service | Services Count | Leak CO ₂ | 4.276 | lb/service-yr |
| Unprotected Steel Pipeline Service | Services Count | Oxidation CO ₂ | 2.196 | lb/service-yr |

A. From GHGCalc™ V1.2; derived from data from 1996 GRI/EPA Study.

1

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Source: AGA, *Greenhouse Gas Emission Estimation Methodologies, Procedures, and Guidelines for the Natural Gas Distribution Sector* Table 5-3 (April 2008).

3

4

5

A 2007 report issued by the National Institute of Standards and Technology, “Analysis of Pipeline Steel Corrosion Data From NBS (NIST) Studies Conducted Between 1922-1940 and Relevance to Pipeline Management,” discusses the role of soil composition on pipeline corrosion, with a significant focus on the effect of different soil groups on bare pipeline. This

6

7

8

1 study examined soil conditions nationally, and concluded that the soils that predominate in South
2 Jersey's service territory, podsol soils, are highly corrosive on buried mains, especially bare
3 mains. Overtime, leaks due to corrosion increase exponentially, and mains in more corrosive
4 soil conditions will feel the most significant increase.

5 **3. Estimated Methane Emissions from the Company's Bare Steel Mains**

6 In 2009, the Company engaged Blue Source, LLC, an experienced GHG emissions
7 verification consultancy, to complete an inventory of estimated GHG emissions from the
8 Company's operations. Blue Source has analyzed the potential methane emissions from the
9 Company's 1,113 miles of unprotected steel, 259 miles of cast iron mains, and its bare steel
10 services to estimate and monetize the carbon reduction credits associated with SJG's acceleration
11 of its replacement program for unprotected bare and coated steel, and cast iron mains. Blue
12 Source calculates that over the next ten years the AMRP will prevent about 16,660 metric tons of
13 fugitive methane from being released into the atmosphere. This translates into a reduction of
14 350,000 metric tons of CO₂ equivalents ("mtCO₂e") that otherwise would be released under
15 South Jersey's business-as-usual main replacement program. Since methane resides in the
16 atmosphere for at least 10 years, the AMRP will yield compelling environmental benefits far into
17 the future. Blue Source's estimate is based on the AGA Guideline, which applies the emission
18 factors for unprotected steel mains and services from the EPA/GRI Study, namely 4,652
19 lb/mile/year of unprotected steel main and 71.81 lb/service/year of unprotected steel service.¹⁰

20 From a GHG standpoint, the annual fugitive methane emissions from the Company's
21 unprotected steel distribution mains and services are the equivalent of the CO₂ emissions from

¹⁰ See EPA/GRI Study, Table 5-3.

1 18,692 light duty cars.¹¹ Replacing these unprotected steel mains through the AMRP mostly
2 with plastic and in some instances with cathodically protected coated steel pipe would reduce the
3 Company's methane emissions roughly by 85%, which is expected to reduce fugitive methane
4 emissions by 350,000 metric tons over ten years, the equivalent of removing roughly 90,000 cars
5 and trucks from New Jersey's highways or of converting 844,391 New Jersey homes--nearly 1/3
6 of all homes in the state--to high-efficiency tankless hot water heaters.¹² , Such a significant
7 reduction goes along way in helping the State achieve its goal of reducing GHG emissions to
8 1990 levels by 2020.

9 **4. The AMRP is Consistent with New Jersey's Global Warming Response Act**

10 In 2007, New Jersey enacted the Global Warming Response Act,¹³ which declared global
11 warming to be a pervasive and dangerous threat internationally, nationally and locally. The Act
12 committed the State to reduce CO₂ emissions to 1990 levels by 2020 and to 80% below 2006
13 levels by 2050. The Act directed NJDEP, in consultation with the BPU and other State agencies,
14 to evaluate policies and measures that will enable the State to achieve the 2020 limit. The Act
15 stressed the importance of a coordinated Statewide effort toward reaching the aggressive GHG
16 reduction goals, and urged the active involvement and participation of public utilities. The Act
17 directed NJDEP to issue regulations requiring gas public utilities and other regulated entities to

¹¹ Assuming light duty vehicles emit 3.9 metric tons per year CO₂ based on 12,000 miles/year at 27 miles-per-gallon and 19.4 pounds of CO₂ per gallon of gasoline combusted.

¹² On average natural gas tankless water heaters with an EF of .82 reduce energy costs by 30% and CO₂ emissions by 27.5 percent or 829 pounds per year over conventional hot water heaters. *See*, Alliance to Save Energy, <http://ase.org/content/article/detail/3922>; U.S. Environmental Protection Agency and U.S. Department of Energy, Energy Star Program, Whole-Home Gas Tankless Water Heaters, http://www.energystar.gov/index.cfm?c=gas_tankless.pr_savings_benefits.

¹³ N.J.S.A. 26:2C-41c.

1 report their GHG emissions. In January 2009, NJDEP proposed new reporting rules that would
2 require the Company to report its annual losses of natural gas caused by leaks and accidents.¹⁴

3 The AMRP will advance the State’s commitment to reduce GHG emissions under the
4 Act. Accelerating the replacement of the Company’s bare steel mains and services and cast iron
5 mains under the AMRP will help slow the growth in methane emissions from the State’s natural
6 gas system, while helping the State to achieve the GHG reductions mandated under the Act.

7 **5. The AMRP is Consistent with the Energy Master Plan**

8 The AMRP also is consistent with the New Jersey Energy Master Plan (“EMP”), the
9 State’s roadmap for achieving the necessary reductions in GHG emissions associated with
10 energy delivery and consumption. The EMP recommends a series of policies and measures to
11 reduce GHG emissions associated with electricity and heating fuels and establishes as a major
12 goal reducing energy consumption by at least 20% by 2020. Action Item #1 of the EMP directs
13 the State to work with electric and gas utilities to identify the necessary upgrades to each utility’s
14 infrastructure to ensure the reliability of the system and improve its ability to help meet the 2020
15 energy consumption target.

16 The AMRP will advance the State’s commitment to reduce energy consumption by at
17 least 20% by 2020. A unit of natural gas conserved through improved distribution infrastructure
18 is equally effective in advancing the EMP goals as a unit saved through demand measures or
19 consumption efficiency improvements. In fact, from a global warming perspective, given
20 methane’s greenhouse potency, reductions in fugitive emissions of natural gas are 21 times more
21 effective than end-use conservation measures which only reduce the CO₂ associated with the
22 combustion of natural gas.

¹⁴ See NJDEP, *Proposed Rules for Greenhouse Gas Monitoring and Reporting Program*, N.J.A.C. 7:27-21.11(b)3.vi., 41 N.J.R. 337(a) (January 20, 2009), <http://www.nj.gov/dep/rules/proposals/012009a.pdf>.

1 **C. The Generation of Voluntary Emission Reduction Revenue**

2 If the AMRP component of the Reliability Tracker is approved, the Company intends to
3 pursue voluntary GHG emission reduction credits associated with its AMRP, which if successful
4 will generate revenues that the Company will offset against the tracking mechanism. To the
5 Company’s knowledge, this would be the first accelerated main replacement project in the
6 United States to qualify for GHG emission reduction credits. The Company believes it may
7 qualify for voluntary emission reduction (VER) credits, as described more fully below. To better
8 understand how this would work, it is useful to present a brief discussion on how cap & trade
9 programs are set up.

10 Simply, a cap and trade program functions by defining a universe of known pollution
11 sources, measuring their individual emissions, allocating permits allowing them to emit (referred
12 to as “allowances”), and finally “capping” their net emissions at a specified level which is then
13 lowered over time, thereby achieving net emission reductions across the regulated universe. To
14 comply with their individual caps, “covered” sources must measure and report their emissions
15 each year and must hold a sufficient number of allowances (generally the right to emit one ton of
16 a given contaminant) in their allowance account at the end of each year to compensate for their
17 emissions for the entire year. Allowances are allocated to covered sources, usually through some
18 combination of auctioning and free conveyance, based on a level below their prior year emission
19 level. In this way, overall emissions from all covered sources are reduced over time. Covered
20 sources unable to reduce their emissions to the level of their allowance allocation must purchase
21 allowances from other covered sources that have reduced their emissions to a level below their
22 allocation. Excess allowances can be bought and traded between covered sources within the
23 program, thereby creating an efficient market that favors the lowest-cost pollution reductions.

1 Some cap and trade programs also authorize pollution sources not subject to the cap (i.e.
2 sources outside the universe of covered sources) to reduce their emissions below a documented
3 baseline or reference case and to sell those emission reductions to covered sources within the
4 cap. These are known as “offsets.” Offsets can be purchased by covered sources to cover their
5 emissions in lieu of generating their own emission reductions.

6 As discussed more fully below, a key requirement that must be demonstrated to get credit
7 for an offset project is the requirement of “additionality”—the principal that only voluntary
8 pollution reductions (i.e. those that would not have occurred absent the expectation of receiving
9 an offset) should get credit. Reductions already required by law or the economics of which
10 suggest they would occur, regardless of offset credits, generally are not eligible for offset
11 credits.

12 The cap and trade regulation model has been used successfully under the Federal Clean
13 Air Act to reduce sulfur dioxide emissions from coal electrical generation plants and nitrogen
14 oxide emissions from fossil fuel combustion sources, like coal and natural gas electrical
15 generation plants and boilers. The cap and trade model likewise is used to reduce CO2
16 emissions under the Regional Greenhouse Gas Initiative (RGGI) and is the model proposed in
17 the federal GHG bills now pending in the Congress.

18 RGGI caps CO2 emissions from electrical generation units of 25 MW or larger within the
19 ten-state RGGI region. RGGI allows GHG reductions from non-covered sources to generate
20 offsets, including energy efficiency projects, landfill methane, and afforestation projects.
21 However, methane reductions from natural gas transmission and distribution equipment
22 improvements are currently excluded. While the original March 2006 draft Model Rule included

1 as an offset category reductions in emissions from natural gas transmission and distribution
2 equipment, this offset category was eliminated from the final regulations.

3 To date, the Congress has not passed national GHG legislation. In the wake of the
4 Supreme Court’s ruling that CO₂ and other GHGs are “pollutants” subject to the Clean Air Act,
5 however, the EPA has moved forward with its own regulatory agenda to control GHGs.

6 On October 30, 2009, the EPA published its Final Mandatory Reporting of Greenhouse
7 Gases Rule, which requires the reporting of GHG emissions from large sources and suppliers in
8 the United States.¹⁵ The stated purpose of the rule is to collect accurate and timely emissions
9 data to inform future policy decisions. Local natural gas distribution companies must report their
10 annual GHG emissions that would result from complete combustion or oxidation of the annual
11 volume of natural gas provided to end-users on their distribution systems. However, fugitive
12 methane emissions from the distribution system are not required to be monitored or reported.

13 A national GHG bill may be enacted in the coming years, which may incorporate some
14 form of a cap and trade program. Proposed legislation has been introduced in both houses of
15 Congress, each of which would distribute emission allowances among natural gas local
16 distribution companies and would provide for offsets from the capture of venting, flaring, and
17 fugitive emissions from distribution systems. Both proposed bills would also provide credit to
18 companies that voluntarily reduce their emissions within three years after passage of the law or
19 when EPA issues voluntary offset regulations (“Early Offset Credits”). If either bill is enacted,
20 voluntary reductions in methane emissions undertaken by the Company within the three year
21 period following enactment of the bill could have added market value under a federal cap and
22 trade program.

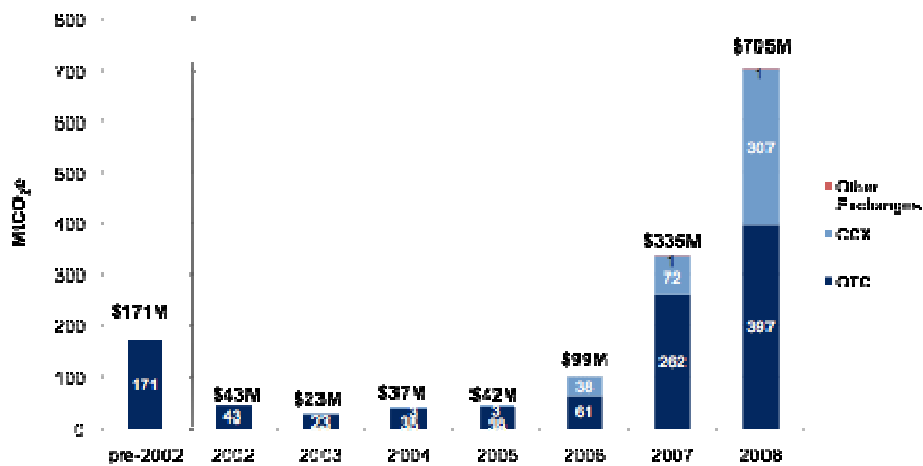
23

¹⁵ 74 Fed. Reg. 56260 (October 30, 2009), 40 C.F.R. §98.402(b).

1 1. Voluntary Emission Reduction Credits

2 Although the Company's AMRP will not currently qualify for RGGI offsets and no
3 federal program is in place, it still may qualify for voluntary emission reduction (VER) credits,
4 which are issued by third-party verifiers and sold on the voluntary carbon market. The
5 worldwide carbon markets can be divided into two segments: the regulatory or "compliance"
6 markets (e.g. RGGI) and the voluntary markets. As the name implies, the voluntary carbon
7 markets include all carbon offset trades that are not required by regulation. The voluntary carbon
8 markets themselves have two distinct components: the Chicago Climate Exchange (CCX), which
9 is a voluntary but legally binding cap-and-trade system, and the broader, non-binding "Over-the-
10 Counter" (OTC) offset market.¹⁶ In 2008, the global voluntary carbon markets nearly doubled
11 their transaction volume over 2007, trading 123.4 million metric tons of carbon dioxide
12 equivalent (MtCO₂e).

Historic Values for the Voluntary Carbon Markets



Source: Ecosystem Marketplace, New Carbon Finance.

¹⁶See Hamilton K, Sjardin M., Shapiro A., Marcello, T., *Fortifying the Foundation: State of the Voluntary Carbon Markets 2009, A Report by Ecosystem Marketplace & New Carbon Finance* (May 20, 2009)

http://ecosystemmarketplace.com/documents/cms_documents/StateOfTheVoluntaryCarbonMarkets_2009.pdf

1 Below is a recent summary of VER prices from a leading carbon market broker,
2 Evolution Markets.

**Verified Emission Reductions (VERs)
Offers**

| TYPE | COUNTRY | SIZE (tons CO ₂ e) | VINTAGE | BID/ASK | PRODUCT |
|-------------------|-------------|-------------------------------|-----------|------------------|--------------------------------|
| Livestock Methane | Western USA | 25k/year | 2009-2015 | \$7.00 / \$10.50 | Climate Action Reserve (CRT's) |
| Landfill Gas | Mid-USA | 75k/year | 2009-2013 | \$6.00 / \$8.50 | Climate Action Reserve (CRT's) |
| Forestry | California | 50k/year | 2009-2013 | \$7.50 / \$12.00 | Climate Action Reserve (CRT's) |
| Seller's Choice | N/A | 35k/year | 2009-2013 | \$6.25 / \$8.00 | Climate Action Reserve (CRT's) |

3
4 **Source:** Evolution Markets, U.S. GHG Market Monthly Market Update October 2009
5 http://new.evomarkets.com/scripts/getmmu.php?uid=web&mmu_id=464

6 VERs represent real and third-party verified reductions in greenhouse gas emissions that
7 are registered with a formal voluntary registry and sold in the OTC market. To qualify for
8 issuance of VERs an emission reduction project must be verified by a third-party using an
9 accepted methodology. Credits are typically generated annually for a ten year project period. In
10 the case of the Company's AMRP, several potential methodologies are available to measure and
11 verify the methane reductions. Generally, credits issued under any state regulatory or voluntary
12 greenhouse gas emission offset program must be issued in accordance with comparable standards
13 that ensure that credited emission reductions are: (i) permanent, (ii) additional, (iii) verifiable,
14 and (iv) enforceable. Blue Source estimates that the carbon credits generated by the AMRP will
15 have a value on the voluntary carbon market of at least \$4/mtCO₂e, yielding at least \$1,400,000
16 in revenue to SJG's customers over 10 years.

17 **2. EPA Natural Gas Star Program**

18 In connection with the AMRP, the Company is considering joining the EPA's Natural
19 Gas STAR program, a voluntary program that will provide the Company with a framework
20 within which to implement, measure, and document the methane reductions. Because the
21 Natural Gas Star Program is an EPA program, the Company's voluntary emission reductions
22 documented under the program may be more likely to qualify for VERS and for Early Offset

1 Credits under federal cap and trade legislation, assuming third-party verification and satisfaction
2 of the requirements for additionality.

3 The EPA Natural Gas STAR program is a flexible, voluntary partnership program
4 between the EPA and oil and natural gas companies. The program encourages natural gas
5 distribution companies, among others, to voluntarily adopt proven, cost-effective technologies
6 and practices that reduce methane emissions. Through program participation and reporting,
7 companies create a permanent record of their voluntary accomplishments in reducing methane
8 emissions. To join the EPA Natural Gas STAR program, the Company would have to execute a
9 Memorandum of Understanding with the EPA, which will initiate the partnership, demonstrate
10 the Company's commitment to the Program, and identify the Company points of contact. By
11 signing the MOU, the Company will signify its intent to evaluate current and future technologies
12 and management practices that reduce methane emissions, implement them when cost-effective
13 and report these activities to EPA on an annual basis. The Company also will develop an
14 Implementation Plan for the AMRP which is a roadmap for how the Company will actually
15 execute the AMRP, including a mechanism for tracking the methane emission reduction data and
16 activities. Finally, the Company will have to submit an Annual Progress Report documenting the
17 previous year's emission reduction activities and corresponding methane emissions reductions.
18 This report can be submitted through an Online Reporting System.

19 **D. System Upgrades**

20 South Jersey has an excellent reliability record when it comes to its distribution system, and
21 the AMRP will allow South Jersey to continue that record into the foreseeable future. South
22 Jersey regularly replaces mains and services that are older or showing evidence of corrosion. In
23 fact, South Jersey has implemented a specific program to identify mains and services for

1 replacement, and has regularly been replacing approximately 27 miles of main and 2572 services
2 per year before the CIRT. These regularly scheduled and planned replacement projects have
3 helped ensure the reliability of South Jersey's distribution system. Under the AMRP, South
4 Jersey will be better able to continue to ensure excellent reliability by accelerating the
5 replacement of older mains and services in its system. The older mains and services that South
6 Jersey replaces will include the bare steel mains and services as well as the cast iron mains,
7 where a majority of gas leaks tend to occur.

8 Of the Company's 1,078 miles of unprotected bare steel main currently in service, 110 miles
9 were installed between 1900 and 1920. An additional 308 miles of unprotected bare steel main
10 currently in service was installed between 1920 and 1939, with 590 more miles installed between
11 1940 and 1959. Replacement of these mains with plastic or cathodically protected coated steel
12 mains will ensure that South Jersey's system reliability remains excellent.

13 Unprotected bare steel mains and services buried in the earth corrode at an exponential pace
14 as the pipe gets older with time. Gas system operators, including South Jersey have had to
15 consistently increase the installation of leak repair clamps on corroding pipe or the replacement
16 of corroding pipe. Corrosion may occur over the entire surface of the pipe and it may take many
17 years before the first occurrence of corrosion occurs. Once corrosion begins on a pipeline
18 segment, however, additional corrosion typically occur in a shorter and shorter timeframe as the
19 corrosion pits completely breach the wall of the pipe. Eventually many additional points of
20 corrosion may result in the pipe becoming fragile and sometimes unreparable. This increase in
21 deterioration is directly a function of length of time in the ground.

22 Currently, South Jersey replaces unprotected bare and coated steel main in service at an
23 average rate of approximately 24 miles per year and cast iron main at a rate of approximately 2.7

1 miles per year.¹⁷ At this rate, it will take the Company 46 years to replace its existing
2 unprotected coated, bare steel and cast iron main. Similarly, South Jersey replaces
3 approximately 1,984 unprotected bare steel services and 588 unprotected coated steel services
4 per year. At this pace it will take the Company approximately 16 years to replace these services.

5 Accelerating the replacement of its cast iron main, and unprotected bare steel main and
6 services currently in service will improve reliability by reducing the amount of mains and
7 services which need to be repaired or replaced on an ad hoc basis when leaks are discovered. It
8 will also allow South Jersey to repair or replace newer mains and services in its system sooner
9 because older mains will have been replaced. The CIRT has provided South Jersey with a pilot-
10 like program for accelerating main replacement, and has given us the opportunity to consider its
11 current unprotected bare steel and cast iron main replacement rate of 26.7 miles per year. In view
12 of its current and projected resources, the Company has determined that it can manageably
13 implement an AMRP that replaces unprotected bare steel and cast iron main at a rate of 62 miles
14 per year, or more than twice the pre-CIRT rate. At this accelerated pace, South Jersey would be
15 able to replace all of its cast iron main and unprotected bare steel main currently in service
16 within approximately 20 years. Additionally, South Jersey can likewise accelerate the
17 replacement of its unprotected bare and coated steel services from 2,572 services per year to
18 4,102, reducing the currently projected 16 year replacement timeline to 10 years.

19 Additional benefits will be felt by the public as a whole, including fewer unplanned
20 traffic disruptions associated with emergency gas leak repairs and improved coordination with
21 local municipalities. Implementing an AMRP will better allow South Jersey to ensure that its

¹⁷ South Jersey attempts to eliminate or repair leaks caused by corrosion of iron mains and unprotected bare steel mains and services and to slow future leaks by, among other things, installing one or more magnesium anodes, which may delay the effects of corrosion on portions of the mains. The Company also maintains a leak management database to better identify main segments that are more likely to require the most immediate replacement.

1 delivery system remains properly functioning and that it continues to provide reliable delivery of
2 natural gas to customers going forward.

3 As the actual cost of such an accelerated program is unknown at this time, the Company
4 is proposing that the expenses related to the AMRP be recovered through its proposed Reliability
5 Tracker as described further in Mr. Pignatelli's testimony. If approved, an estimated
6 \$24,327,480 in capital expenditures associated with the AMRP will be placed in the tracker in
7 the first year of the twenty year program.

8 **VI. Summary**

9 The issues reflected in this testimony represent significant levels of expenditures for the
10 normal costs of doing business. South Jersey's extensive construction program has continued at
11 a high pace and has increased rate base. As has been noted throughout the testimony of the other
12 Company witnesses in this case, the Company must maintain its access to capital markets in
13 order to continue to fund its ongoing growth. Construction expenditures are the primary source
14 of capital requirements for the Company and as such, it is recommended that the Board approve
15 inclusion of these costs in its final rate base calculations, and implement the proposed Reliability
16 Tracker.

SOUTH JERSEY GAS COMPANY
PRO FORMA ADJUSTMENTS TO JUNE 30, 2010
MAJOR CONSTRUCTION PROJECTS

| Line No. | | Test Year Projection | Post-Test Year Projection | Total Projection | Projected In Service Date |
|----------|---------------------------------------|----------------------|---------------------------|------------------|---------------------------|
| 1 | Transmission Valve Upgrades (0795) | \$1,438,688 | \$0 | \$1,438,688 | 12/31/2009 |
| 2 | Swedesboro Station Upgrade (0798) | \$1,035,496 | \$0 | \$1,035,496 | 12/31/2009 |
| 3 | 12" Rio Grande - Wildwood PL (0857) | \$3,520,670 | \$0 | \$3,520,670 | 12/31/2009 |
| 4 | Wildwood Regulator Station (0799) | \$249,956 | \$0 | \$249,956 | 12/31/2009 |
| 5 | LNG Plant Generator (0796) | \$2,240,380 | \$0 | \$2,240,380 | 1/15/2010 |
| 6 | 24" Malaga - Vineland Pipeline (0705) | \$25,735,111 | \$0 | \$25,735,111 | 1/31/2010 |
| 7 | Union Road Station (0783) | \$1,856,491 | \$0 | \$1,856,491 | 1/31/2010 |
| 8 | 20" Union Road Rt 50 Upgrade (0797) | \$726,923 | \$126,179 | \$853,103 | 6/30/2010 |
| 9 | 12" Atco-Stokes Road PL (0859) | \$5,131,801 | \$3,343,320 | \$8,475,121 | 6/30/2010 |
| 10 | Woodbine Regulators | \$100,563 | \$99,900 | \$200,463 | 7/31/2010 |
| 11 | Malaga Station Heater | \$0 | \$500,055 | \$500,055 | 10/1/2010 |
| 12 | LNG Pump Skid | \$2,037,800 | \$1,712,200 | \$3,750,000 | 11/1/2010 |
| 13 | Hardingville Station | \$0 | \$500,051 | \$500,051 | 11/1/2010 |
| 14 | Deepwater Station | \$8,294 | \$242,938 | \$251,231 | 11/1/2010 |
| 15 | 8" PP Main - Route 538 | \$0 | \$250,303 | \$250,303 | 12/1/2010 |
| 16 | CMCH to Burleigh 16 (0989) | \$1,000,140 | \$6,160,500 | \$7,160,640 | 12/31/2010 |
| 17 | CMCH to Burliegh Station (1206) | (\$797) | \$399,156 | \$398,359 | 12/31/2010 |
| 18 | Black Horse Pk - Delilah Rd 24 (1200) | \$1,106,400 | \$6,547,013 | \$7,653,414 | 12/31/2010 |
| 19 | LNG Vaporizer (1205) | \$3,094,845 | \$1,898,838 | \$4,993,683 | 12/31/2010 |
| 20 | Beckett Station | \$0 | \$200,000 | \$200,000 | 10/1/2011 |
| 21 | Harmony Road Scrubber Piping | \$0 | \$300,000 | \$300,000 | 10/1/2011 |
| 22 | Uprate Ocean Heights Avenue | \$0 | \$250,000 | \$250,000 | 11/1/2011 |
| 23 | LNG Tank Underground Heater/Sump | \$0 | \$675,000 | \$675,000 | 11/1/2011 |
| 24 | Patcong Creek Regulators | \$0 | \$250,000 | \$250,000 | 11/1/2011 |
| 25 | Mickelton Station | \$0 | \$190,000 | \$190,000 | 11/1/2011 |
| 26 | Non-CIRT Capital Expenditures | \$ 1,951,646 | \$ 966,075 | \$2,917,721 | 12/31/2010 |
| 26 | Total Pro Forma Adjustment | 51,234,408 | 24,611,528 | 75,845,936 | |

SOUTH JERSEY GAS COMPANY
Main Replacement Costs 2011-2030

| Mains | | | | Services | | | |
|-----------------|-------|---------------|-----------------------|-----------------|--------------------|-----------------|-----------------------|
| Year | Miles | Cost per Foot | Total Cost | Year | Number of Services | Amt per Service | Total Cost |
| 2011 | 62 | \$48.00 | \$ 15,713,280 | 2011 | 4102 | \$2,100.00 | \$ 8,614,200 |
| 2012 | 62 | \$49.44 | \$ 16,184,678 | 2012 | 4102 | \$2,163.00 | \$ 8,872,626 |
| 2013 | 62 | \$50.92 | \$ 16,670,219 | 2013 | 4102 | \$2,227.89 | \$ 9,138,805 |
| 2014 | 62 | \$52.45 | \$ 17,170,325 | 2014 | 4102 | \$2,294.73 | \$ 9,412,969 |
| 2015 | 62 | \$54.02 | \$ 17,685,435 | 2015 | 4102 | \$2,363.57 | \$ 9,695,358 |
| Subtotal | | | \$ 83,423,938 | Subtotal | | | \$ 45,733,958 |
| 2016 | 62 | \$59.42 | \$ 19,451,731 | 2016 | 4102 | \$2,599.93 | \$ 10,664,913 |
| 2017 | 62 | \$61.20 | \$ 20,035,283 | 2017 | 4102 | \$2,677.93 | \$ 10,984,860 |
| 2018 | 62 | \$63.04 | \$ 20,636,342 | 2018 | 4102 | \$2,758.27 | \$ 11,314,406 |
| 2019 | 62 | \$64.93 | \$ 21,255,432 | 2019 | 4102 | \$2,841.01 | \$ 11,653,838 |
| 2020 | 62 | \$66.88 | \$ 21,893,095 | 2020 | 4102 | \$2,926.24 | \$ 12,003,453 |
| 2021 | 62 | \$68.88 | \$ 22,549,888 | | | | |
| 2022 | 62 | \$70.95 | \$ 23,226,384 | | | | |
| 2023 | 62 | \$73.08 | \$ 23,923,176 | | | | |
| 2024 | 62 | \$75.27 | \$ 24,640,871 | | | | |
| 2025 | 62 | \$77.53 | \$ 25,380,097 | | | | |
| 2026 | 62 | \$79.86 | \$ 26,141,500 | | | | |
| 2027 | 62 | \$82.25 | \$ 26,925,745 | | | | |
| 2028 | 62 | \$84.72 | \$ 27,733,518 | | | | |
| 2029 | 62 | \$87.26 | \$ 28,565,523 | | | | |
| 2030 | 62 | \$89.88 | \$ 29,422,489 | | | | |
| Subtotal | | | \$ 361,781,074 | Subtotal | | | \$ 56,621,471 |
| TOTAL | | | \$ 445,205,011 | TOTAL | | | \$ 102,355,428 |