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Date: 10/17/2013 2:39 PM
Subject: Revised Response to Questions Raised By P&I Committee
Attachments: SJG Responses to Questions Raised at P&I Committee 9-27-13.pdf

Dear Nancy & Stacey:

Attached please find a slightly revised response to the questions raised at the 9/27 P&I Committee meeting. The only changes are to clarify that bentonite is natural clay (Q 1, p. 1) and that natural gas is not soluble in water (Q 17, .12)

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South Jersey Gas Responses to Questions Raised at the September 27th P&I Committee Meeting

1. Bentonite – How does drop in pressure translate in terms of amount of drilling fluid that escapes from a break out? Can you estimate it in terms of volume? Gallons?

Bentonite is a natural, non-hazardous, cohesive water absorbing clay named after the Benton Shale near Rock River, Wyoming. In the unlikely event of a breakout, the amount of drilling mud that could escape would depend on specific conditions but generally could be a few hundred gallons to only a few gallons, if at all. It is important to note that any such breakout likely would occur within the roadway where the drilling will occur and would be captured by containment berms that will be installed downslope from each drill entry and exit point to contain any release of drilling mud. Also, each Horizontal Direction Drill (HDD) crossing along Rt. 49 is below existing concrete channels or conveyances that would reduce the potential for a breakout. To minimize any potential impact, SJG has prepared a Breakout Contingency Plan that requires continuous monitoring of the entire HDD drill path to identify and contain any leakage, if any occurs. Any sign of a breakout condition will cause drilling to be halted. SJG also will specify the use of appropriate drilling fluid as well as a Downhole Pressure Monitoring Device as an additional precaution against a breakout. This technology helps the driller monitor the drill head pressures to avoid a condition where the drilling fluid pressure exceeds the allowable pressure of the soil conditions thus resulting in a breakout. The driller will also observe the drilling fluid return to insure circulation of the drilling fluid, which also reduces the chance of a breakout. The HDD monitoring program will include the following:

- Visual monitoring of the overland drill alignments and the surface waters along Rte 49 by on-site monitoring personnel on a continuous basis to monitor for evidence of any drilling fluid breakout points;
- Drilling fluid volume flow monitoring on a continuous basis by drilling technicians throughout the drilling and borehole reaming operations for each HDD conduit system;
- Development and implementation of a fluid loss response plan and protocol (water and land) by the drill operator in the event that a fluid loss is discovered.

2. Is there any data/studies on bentonite break out risks? Especially, the risk of a breakout occurring under water?

SJG is not aware of any data or studies on this subject. Breakouts, while they do occur, are not tracked by industry because a breakout does not represent a discharge of a hazardous substance and the bentonite is cleaned up immediately. Regarding the risk of a breakout on the proposed project, the table below summarizes the 4 HDD's. The maximum under water length is 50 feet or 4.37% of the total HDD drill length for these drills. In addition, the depth of the HDD ranges from 37 to 49 feet below the water elevation. The weight of overlying soils associated with this depth dramatically reduces the chances of breakout beneath the waterway. In regard to the soil conditions, the geotechnical investigations at the HDD locations indicate that the soils would be a low breakout risk due to the sandy conditions present. Finally, it should be noted that only 1 HDD will actually be under water; the other 3 will be under concrete structures or a concrete pipe.

Horizontal Directional Drills - SJG - BL England Project								
Crossing	Crossing Name	Structure to be drilled under	Total length of drillll	*Maximum depth of drill	Distance from structure to top of Pipe	Distance from Water Bottom to Pipe	Underwater Length	% Underwater
R1	Cumberland Pond on Rte 49	Bridge and Dam Piles	2438.2	62.7	17	37	25	1.03%
R2	Tuckahoe River @ 1st Ave on Rte 49	Headwalls of bridge	2292.2	55.5	38.2	43.7	50	2.18%
R3	Tuckahoe River @ Head of River Rd on Rte 40	Headwalls of bridge	1145	61.2	17.7	49.2	50	4.37%
R4	Mill Creek on Rte 49	Headwalls of bridge	2123.7	58.3	44.5	46.2	40	1.88%

**Maximun depth of drill does not always occur under structure*

3. Why is there a greater risk of breakout for the 7,000 linear foot HDD under the Great Egg Harbor Bay? Please explain the "curve" statement made during P&I.

The risk is greater because the continuous length of HDD under the Great Egg Harbor waterway is significantly longer than the other stream crossings along Rt. 49. The crossings proposed are well beneath the small waterways along Rt. 49 and all but one are actually below concrete structures. Said another way, crossing 40 feet of a waterway presents significantly less risk than crossing 7000 feet of waterway. Using a properly designed drilling fluid and good construction techniques makes a HDD under Great Egg Harbor possible but the complexity of the multiple curves and length of drill would bring with it increased risk.

Breakouts usually occur, if at all, at entry and exit points of the drills. The Greater Egg Harbor drill would have had open water and wetlands located directly adjacent to the start and finish of the drill thus presenting greater risk and making this drill more vulnerable to damaging wetlands areas. This alternative would have unavoidably impacted wetlands due to the required space needed to attempt the drill. As for the actual HDD design under Great Egg Harbor, the drill would require a compound curve (curves that change both vertically and horizontally at the same time) to align with the landing point at the BL England plant. This curvature of the drill path is more difficult and increases the risk. The other drills on the project use a combination of simple curves. There is one curve that changes vertically. Once that curve is complete a horizontal curve is completed. Finally another vertical curve to reach the surface is completed. This three stage process allows easier control of the drill head.

4. Is the risk the same for the HDDs that are being performed as part of Route A? If not, why not? What is the potential risk of a breakout under a wetland or stream crossing?

All HDD's need to be properly designed and constructed with good drilling practices using a proper drilling fluid to be successful. This is true for all HDD's for any route. What makes the HDD's different is the conditions present at the drilling locations and the obstacles that are being avoided. Hence, drilling under a 40 foot wide stream or a concrete pipe is much different than drilling under Great Egg Harbor over a distance of 7000 feet. The risk associated with a smaller water crossing is considerably less than the risk of a 7000 foot crossing with compound curves.

5. How many HDDs will there be as part of the construction. Need a diagram for each of these HDDs in the Pinelands Area showing location, depth, potentially impacted resources; this is especially the case for wetland/stream/pond crossings.

As discussed at the presentation, there are 4 HDDs located in the Pinelands jurisdiction. Details are included in the drawings submitted to the Pinelands, including the starting and ending locations, depth, and soil borings. All the resources in the area have been delineated in the field (including wetlands, streams and ponds) and reviewed in the field by Pinelands Commission staff, US Army Corps of Engineers and the NJ Department of Environmental Protection in the Coastal Zone.

6. Need a list of the BMPs that are going to be used on the proposed route of the project and indicate whether used throughout the route or whether used in specific locations, and, if so, identify the location and the BMP for that location and what it is intended to address.

The application to the Pinelands includes all the BMPs that have been incorporated into the design of this project. The plans include details of the BMPs and clearly show their location along the entire length of the project. BMPs include silt fencing that is designed to act as a limit of disturbance in the field, protect the adjacent properties from erosion and siltation and act as a barrier to deter migration of certain wildlife from entering the construction area. As recommended by Trident Environmental Consultants additional protective BMPs were incorporated into the design at the intersection of Route 49 and the Conectiv power line ROW that include a double row of silt fence and an orange construction fence to deter foot traffic from entering the power line ROW which includes a known protected plant population.

7. Need clarification on the soils that will be used to backfill over the pipe; Will excavated soils be stockpiled and used to backfill? If not, how will you ensure that the fill material used does not result in the introduction of invasive, non-native species?

The intent is to use the excavated soils as backfill for the project. During excavation, the soil shall be stockpiled alongside of the trench. Prior to backfilling the inspector will determine whether the soil is suitable for backfill. Backfill material shall be free of welding rod, lumber and trash. If there are large rocks in the material to be used for back fill, care shall be used to prevent damage to the pipe coating, by such means as by making the initial fill rock free material to a sufficient depth over the pipe to prevent rock damage. Contract specifications require that if additional suitable material is required that it must be native to the area. SJG inspector shall inspect the material and collect, review and approve all weight tickets (material slips) from the trucks that arrive onsite.

8. Is there a gas source from the North, South, or East that can service the B.L. England plant and then go on and provide redundancy through the construction of the portion of the pipeline from B.L. England to the interconnect station?

Slide 6 of the SJG presentation provided on September 27, 2013 to the Commission depicts the existing transmission infrastructure with SJG's territory. The red lines are the only transmissions lines with the necessary volume and pressure to supply the BL England plant. There are no lines to the South or the

East capable of providing the necessary volume and pressure of natural gas to the plant for the conversion from coal and oil to natural gas.

The Alternate Route Analysis and its Addendum previously submitted to the Commission staff and the presentation previously mentioned provide details regarding the route from the North that was not chosen due to both the impact on the local residents (minimum 3 months of relocation) and the impact on the environment (required to fill wetlands to be able to construct the pipeline). The other potential route from the North would travel along Route 50. The reasons this route was eliminated are addressed in response to questions 19 and 20, below.

9. What is the break down in terms of numbers customers in the PNR vs. customers in the state designated Pinelands Area who will lose gas service in the event of a disruption?

Meters affected by Outage in National Reserve	5,677
Meters affected by Outage in NJ Pinelands	20,962
Meters affected by Outage in NJ Pinelands & NR	26,639

Each meter represents a single facility (single family homes, hospitals, nursing homes, etc.) and many more individuals will be impacted than simply the number of meters.

10. Would the negative impacts associated with gas interruption, as described in the power point, still occur even with redundancy? i.e. wouldn't you still have to go house by house and re-establish service even if there was a redundancy line, because redundancy is not seamless?

No, the negative impacts associated with gas interruption would not occur if the reliability line is constructed. Without the reliability line, if a disruption of service were to occur at the Tuckahoe River given the current infrastructure, the main would have to be isolated and that would eliminate service to the 60,000 customers in Cape May County because of the single feed. But, if the reliability line is in place, when the main is isolated at the Tuckahoe River, Cape May County will still receive gas through the reliability line. The tie in location on Marshall Ave. creates a loop preventing the service interruptions from occurring.

[11. OMITTED FROM ORIGINAL QUESTIONS]

12. What is the minimum size of the pipe that is necessary to serve: 1) BL England and redundancy; 2) BL England alone and 3) redundancy alone?

This issue is thoroughly addressed by the supplement to the Black and Veatch report, dated February 10, 2013, that was previously submitted to Commission staff. The system was sized so the BL England Power Plant would receive the required minimum pressure on cold winter days. The system was sized to ensure that if an interruption were to occur the reliability line would be able to provide the necessary pressures to maintain service to the customers within Cape May and Atlantic Counties on cold winter days. The system was *not* sized to supply BL England and provide service to Cape May County at the same time. The system was sized to supply BL England alone or Cape May County alone if a service

interruption were to occur on a cold winter day. The system requires a 24-inch pipeline to provide the volume and pressures required by BL England Plant. The system requires a 24 inch pipeline to provide the volume and pressure required to maintain service to Cape May and Atlantic Counties if an interruption were to occur on a cold winter day. The BPU Director of Energy, Jerry May, confirmed the pipe size is correct in public testimony at the July 26, 2013 Pinelands P&I Committee meeting.

13. Clarify which BPU Order actually "ordered" construction of the pipeline?

The State of New Jersey Board of Public Utilities' order, Docket No. GO13030202, issued on June 21, 2013, and effective as of July 1, 2013, authorized SJG to construct a 24-inch pipeline through Maurice River Township in Cumberland County, City of Estell Manor in Atlantic County, and Upper Township in Cape May County, New Jersey. As discussed more fully in paragraph 21, below, the BPU has broad authority to supervise, regulate and assert jurisdiction and control over public utilities and their property, property rights, equipment, facilities and franchises so far as may be necessary for the purpose of carrying out the provisions of Title 48 of the New Jersey Statutes. N.J.S.A. 48:2-13. The BPU's authority over utilities extends beyond its express statutory powers and includes incidental powers that the agency needs to fulfill its statutory mandated duties. *A. A. Mastrangelo, Inc. v. Comm'r of Dept. of Envl. Prot.*, 90 N.J. 666, 683-84 (1982). This sweeping grant of power is "intended to delegate the widest range of regulatory power over utilities to the Board." *Twp. of Deptford v. Woodbury Terrace Sewerage Corp.*, 54 N.J. 418, 424 (1969). Specifically, the BPU is empowered to direct utilities to furnish safe, adequate and proper service to their customers. N.J.S.A. 48:2-13. Pursuant to N.J.S.A. 48:2-13 and as a prudent and civic-minded public utility in the State, South Jersey did not wait until it was ordered by the Board to take action to address its obligation to provide safe and reliable natural gas service but rather undertook affirmative steps to ensure that it is able to provide such service to its customers, now and into the future. In so doing, SJG has filed three petitions with the Board regarding the proposed pipeline that will provide system reliability to its customers in Atlantic and Cape May counties and serve the BL England Facility.

In its first petition, South Jersey sought approval of the Standard Gas Service Agreement (the "Agreement") entered into between South Jersey and R.C. Cape May Holdings. I/M/O South Jersey Gas Co. and RC Cape May Holdings, LLC, Docket No. GO13010052 (Order April 29, 2013). By way of Order dated April 29, 2013, the Board exercised its jurisdiction over SJG and authorized the negotiated rate. The Board found, *inter alia*, that the rates were based on cost of service and the value of service considerations required by South Jersey's tariff.

In its second petition before the Board related to the proposed pipeline, South Jersey sought approval to construct the proposed pipeline. I/M/O South Jersey Gas Co. for Authorization to Construct a 24-inch Pipeline, Docket No. GO13030202 (Order June 21, 2013). By way of Order in that proceeding, the Board found based upon the presentation of evidence and a public hearing that construction of the pipeline was reasonable and in compliance with all relevant Federal and State requirements. The Board went on to exercise its jurisdiction approving South Jersey request to construct the pipeline subject to, inter alia, any future Memorandum of Understanding between the Board and the Pinelands Commission.

Currently pending before the Board is South Jersey's third petition, which requests the Board enter into a Memorandum of Agreement (MOA) with the Pinelands Commission. The MOA is pending awaiting action of the Pinelands Commission.

14. What documentation can you provide that supports that HDD is proven technology? What documentation can you provide that demonstrates that HDD is the industry standard for installation of pipelines in environmentally sensitive areas?

Horizontal Directional Drilling (HDD) is proven technology in practice for over 50 years. The North American Society for Trenchless Technology (NASTT) (http://nastt.org/about) was founded in 1990 with a mission to educate and foster the use of trenchless technology. It is technology that is now used worldwide to install gas mains, water mains, electric lines and other facilities. The State of New Jersey recognizes that horizontal directional drilling is the preferred method or industry standard for the installation of pipelines in environmentally sensitive areas. The New Jersey Department of Environmental Protection has reviewed the potential impacts on freshwater wetlands and waterways under N.J.A.C. 7:7A, Freshwater Wetlands Protection Act Rules and specifically created a General Permit, N.J.A.C. 7:7A-5.2 General permit 2--Underground utility lines. This General permit authorizes activities in freshwater wetlands, transition areas, and/or State open waters, necessary for the construction and/or maintenance of an underground utility line. In this General permit, N.J.A.C. 7:7A-5.2(b) states:

> "If a utility line is jacked or directionally drilled underground, so that there is no surface disturbance of any freshwater wetlands, transition areas, or State open waters and there is no draining or dewatering of freshwater wetlands, no Department approval is required under this chapter. Jacking or directional drilling is regulated under this chapter if any disturbance occurs to the ground surface in the freshwater wetlands, transition area, or State open water; for example, if the drilling is conducted from a pit located in a freshwater wetland or transition area."

No Department approval is required because they have concluded that the activity will not have a significant impact. The Federal government recognizes that horizontal directional drilling is the preferred method or industry standard for the installation of pipelines in environmentally sensitive area as evidence by the following permit specific regional condition associated with the Nationwide General Permit 12 for Utility Line Activities:

> "2. For the installation of utility lines, the following applies:
>
> b. The utility line should make a direct or perpendicular crossing of a stream. Directional drilling is the preferred method of installation when possible, especially in tidal waters;"

Both the Federal and State agencies that regulate utility line crossings of environmentally sensitive areas have recognized that horizontal directional drilling is a proven technology and is the preferred method of construction for this activity. This technology has been in use for over 20 years and has proven to be a superior construction technique that minimizes environmental impacts.

15. What documentation can you provide that supports the need for the continued use of the B.L. England plant? This answer should address claims by the environmental community that there is no need, because of the development of four new gas plants: West Deptford, Woodbridge, Old Bridge, and Deepwater?

The repowering of the B.L. England facility is necessary to ensure an adequate supply of electricity in the Southern New Jersey region and specifically in the Pinelands Area. The need for natural gas fired power plants, particularly in Southern New Jersey, was recognized early in the Christie Administration. The 2011 Energy Master Plan (EMP) specifically recognized the need for new generation in Southern New Jersey and the need to expand natural gas pipelines to support new, gas fired generation throughout the State. The Director of the Division of Energy of the Board of Public Utilities, Jerry May, stated unequivocally at the July 26, 2013 P&I Committee meeting that the impact of BLE not operating would not be in the best interest of the State of New Jersey and that, absent the BLE plant, it is likely the PJM would need to seek an equivalent level of energy and capacity to meet the stringent reliability requirements. BPU Energy Director May said that while PJM has no authority to build power plants it can order the addition of high tension electrical transmission lines and that, absent BLE, the power would come from the West or the South and high tension lines would be needed in this area, likely adding to the cost of electricity.

New Jersey is located within the heart of the Mid-Atlantic Critical Congestion Area, one of only two such areas in the United States designated by the U.S. Department of Energy due to severely inadequate transmission capacity that threatens the reliability of the electrical grid. In 2006 and again in 2009, the DOE, as directed by the Energy Policy Act of 2005, determined that it is critically important to remedy existing congestion problems in New Jersey because the current and projected effects of the congestion are severe. New Jersey—a state located at the extreme eastern edge of the PJM territory—suffers from limited imports of electricity from the West and South, causing most of the state to face electricity congestion and some of the highest electricity prices in the entire mid-Atlantic area. The state's transmission constraints are made worse by the retirement of several old, inefficient power plants, which has reduced local generation and degraded reliability. *See* U.S. Department of Energy, *National Electric Transmission Congestion Study* (2006 & 2009), available at http://nietc.anl.gov/congestionstudy. Following is a figure taken from the 2006 and 2009 *National Electric Transmission Congestion Study* showing that the entire State of New Jersey is located within the Eastern Critical Congestion Area of Concern and that new West-to-East transmission capacity will be needed to alleviate the problem.

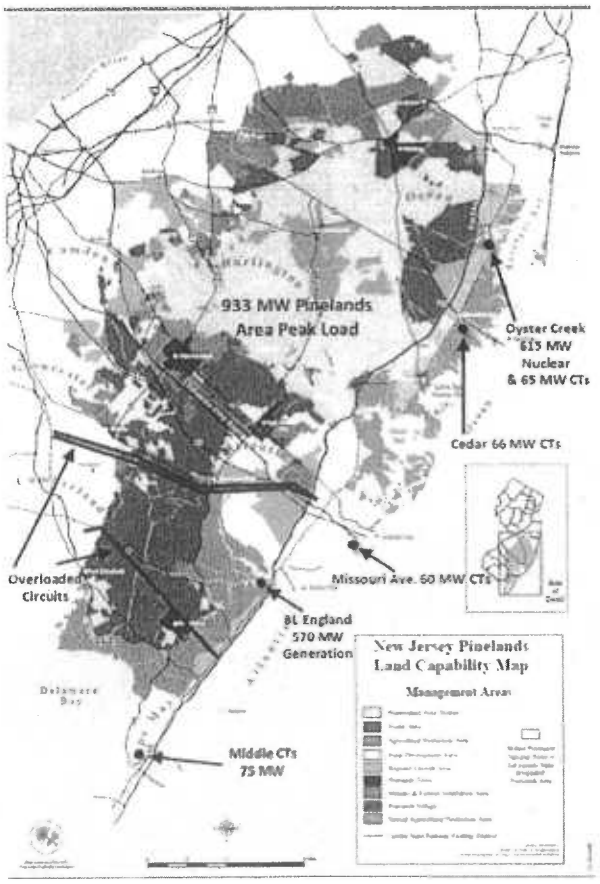
Figure 4-1. Eastern Critical Congestion Area and Congestion Area of Concern Identified in the *2006 National Electric Transmission Congestion Study*

It is against this backdrop that the repowering of the B.L. England plant must be considered. Previous 2012 modeling of B.L. England's supply of electricity to the Pinelands area prepared by PowerGEM, LLC was submitted by SJG to the Pinelands Commission, which demonstrated the clear benefits of repowering the facility to satisfy the electricity needs of southern New Jersey and the Pinelands area, especially with the loss of electric generation from the pending closure of the Oyster Creek Nuclear Generating Station in five (5) years. This modeling recently was updated by PowerGEM based upon the latest information. The evaluation indicates that the reliability need for B.L. England only has increased due to circumstances not present a year ago. PowerGEM finds that if B.L. England is not repowered, eight separate electrical circuits within the Pinelands area will experience overloaded conditions in 2019, necessitating action by the PJM to ensure grid reliability. While it is not possible to predict precisely how PJM will address these grid overloads, a probable solution is the construction of additional transmission capacity, some of which likely would be located within the Pinelands area due to its location immediately west of the heavily populated coastal region of the State.

In June 2012, PowerGEM estimated the percentage of electricity to be generated by BL England that will be consumed in the Pinelands Area. That report estimated that the repowered facility would supply approximately 62% of its electricity to the Pinelands over a 40-year operational life, following the retirement of Oyster Creek in 2019. In October 2013, PowerGEM updated its analysis (attached). The

updated report not only confirms BL England's substantial contribution to the electricity needs of the Pinelands, but also finds that the facility is critical to electrical reliability due to additional loss of generation in the Pinelands area. Three combustion turbines (CTs) located along the coast in the vicinity of the Pinelands Area totaling 201 MW of capacity are scheduled to retire in 2015, thus increasing the importance of continued operation of BL England. Following the retirement of these CTs and Oyster Creek, the BL England will contribute 86% of its output to the Pinelands Area.

Of even greater significance, PowerGEM's study, using PJM's own model, determined that the retirement of BL England would negatively impact eight (8) transmission circuits in proximity to the Pinelands Area. *Notably, PowerGEM's modeling accounted for the planned construction of proposed natural gas generation projects in West Deptford, Woodbridge, Old Bridge and Deepwater.* Even with the construction of these new natural gas electrical generation plants—each of which is located some distance from the Pinelands Area—the PowerGEM analysis finds that BL England is critical. Failure to repower the facility, especially with the retirement of 201 MW of peaking CT generation located along the New Jersey coastline, will cause circuit overloads that are considered transmission violations by PJM and thus will require a solution to avoid the consequences of overloads, *including the potential for blackouts*. In sum, PowerGEM's analysis confirms the conclusions of the 2011 Energy Master Plan (EMP) and BPU Energy Director Jerry May that the BL England facility is essential to electric reliability in the Pinelands and the surrounding region with the retirement of the Oyster Creek Nuclear facility, which is mandated pursuant to an Administrative Consent Order executed by Exelon Generation Company, LLC, and NJDEP in 2010.



16. Provide information concerning the amount of pipeline within South Jersey Gas' system that is located within the Pinelands Area. For each pipeline, please provide the date of construction and copies of annual survey reports? Have any of these pipelines experienced methane leaks? If so, why? How long did it take to identify said leaks? And what was done to correct them? Have any of these pipelines ruptured? Have any of the pipelines within South Jersey Gas' service network ever ruptured?

South Jersey Gas operates three gas transmission pipelines within the Pinelands Area, as follows:

- 20" Union Road to Route 50 – 10.2 Miles, constructed in 1986
- 24" Hamilton-Weymouth – 6.6 Miles, constructed in 2006
- 20" Route 50 – 3.9 Miles, constructed in 2004

All of these pipelines are subject to monthly patrols and an annual leak survey. The monthly patrols are a visual inspection of the pipeline route looking for construction activity near the pipeline and also any visual evidence of leakage, the annual leak survey is done using equipment that is capable of detecting methane at a PPM level. These pipelines have no history of leakage. The operating records of the pipeline patrols and leak surveys are available for inspection at SJG's McKee City facility. South Jersey Gas has never had a transmission pipeline rupture in any portion of the system.

17. What, if any, impact would a rupture of the proposed pipeline have on the K/C aquifer? What is the scientific support for your response? What is the risk of damage to the K/C aquifer as a result of development of the proposed pipeline? Please quantify and explain scientific basis for the answer.

First, the likelihood of a gas main rupture is extremely low. South Jersey Gas has 124 miles of gas transmission line in southern New Jersey; the earliest has been in operation since 1969. South Jersey Gas has never had a rupture of a gas transmission line in the 44 years of operation.

The proposed gas main will be constructed using state-of-the-art materials and protective measures. The gas industry, as with most industries, continually improves the materials and safety measures in their field.

South Jersey Gas maintains the highest safety standards to ensure that preventable accidents are avoided, and problems with the distribution network are remedied in a timely fashion. Safety measures include:

- Leak Detection Equipment – South Jersey Gas has in place sophisticated leak detection equipment, designed to pick up on leaks of natural gas from the distribution network. Utilities also add odorants to the natural gas to make it easier to detect a leak.
- Safety Education Programs – South Jersey Gas runs natural gas safety seminars in schools, community centers, and through other organizations to ensure customers are well versed in natural gas safety procedures and know what to do in the event of a leak or emergency.
- Technicians on Call – South Jersey Gas maintains fleets of technicians on call 24 hours a day, seven days a week to respond to customers' problems and concerns.

- Emergency Preparedness – South Jersey Gas participates in community and local emergency preparedness programs, educating and preparing for emergency events such as natural disasters.
- One Call Systems - Provides customers, contractors, and excavators with a single phone number to call before commencing excavation or construction, to ensure that the pipelines, and other buried facilities are not damaged. A national "call-before-you-dig" phone number of "811" was adopted in 2008 with the support of utilities, communities, emergency responders and government officials.
- Transmission Integrity Management Planning – as required by PHMSA, this pipeline will be equipped with In Line Inspection (ILI) capabilities. A Smart Pig will be inserted on a periodic basis that will inspect the pipeline and verify its integrity. Prior to the pipeline being put in service. It will also be subjected to a hydrostatic test.

One of the primary threats to a natural gas pipeline that could cause a "rupture" is an excavator hitting the pipeline by accident. There are many preventative measures in place like the One Call System in place in New Jersey to minimize this risk. Other protective measures that will be implemented on this project include covering the pipe with a specialized coating to ensure that it does not corrode once placed in the ground. The purpose of the coating is to protect the pipe from moisture, which causes corrosion and rusting. Today, pipes are often protected with what is known as a fusion bond epoxy. In addition, cathodic protection will be used; which is a technique of running an electric current through the pipe to ward off corrosion and rusting. This will protect the pipeline over time. With all of these measures in place a "rupture" of the pipeline is not a probable event. That being said, if a rupture did occur South Jersey Gas has emergency measure in place and a rupture would trigger an immediate response.

In order to manage the natural gas that enters the pipeline, and to ensure that emergency measures are in place in the event of an incident, sophisticated control systems are required to monitor the gas as it travels through all sections of what could be a very lengthy pipeline network. To accomplish this task of monitoring and controlling the natural gas that is traveling through the pipeline, centralized gas control stations collect, assimilate, and manage data received from monitoring and compressor stations all along the pipe. These systems are essentially sophisticated communications systems that take measurements and collect data along the pipeline (usually in a metering station and valves) and transmit it to the centralized control station. Flow rate through the pipeline, operational status, pressure, and temperature readings are all used to assess the status of the pipeline at any one time. These systems also work in real time, meaning that there is little lag time between the measurements taken along the pipeline and their transmission to the control station. The data is relayed to a centralized control station, allowing pipeline engineers to know exactly what is happening along the pipeline at all times. This enables quick reactions to equipment malfunctions, leaks, or any other unusual activity along the pipeline.

In event of a "rupture" the gas flow in the pipeline would be shut off quickly. Since the gas flow would be shut off quickly the gas would not continue to flow after such an event. Since natural gas is much less dense than air, weighing about half as much (55 percent) as the same volume of dry air at the same pressure, it is buoyant in air and in soil. Methane gas released from an unlikely rupture of the pipeline would rise through the soil column above the pipeline and would be released to the air where it would dissipate quickly. Unlike a petroleum release from a leaky underground storage tank natural gas released from a pipeline does not seep into groundwater or spread horizontally. Natural gas is virtually

insoluble in water at the surface pressure associated with the pipeline and therefore would not pose a significant threat to ground or surface water.

Since the greatest risk to a natural gas pipeline such as this one is physical damage from an accidental excavation the least likely location of a rupture would be the deepest sections of pipe at the horizontal directional drilling locations. Therefore, it is reasonable to assume that in the unlikely event of a rupture it would occur along the pipeline route where the pipeline is four feet below the surface. Geotechnical borings taken at the four HDD locations in the Pineland indicate that the Kirkwood/Cohansey formations range from 11 to 39 feet below the ground surface location.

The Kirkwood-Cohansey aquifer system is made up of highly permeable unconsolidated sands and gravels that facilitate the migration of contaminants from the land surface into the system (Stackelberg and others, 1997). This same geological condition would allow natural gas, in the event of a pipeline breach, to pass through the highly permeable unconsolidated sands and gravels and travel to the surface away from the aquifer. Below is a summary of the typical South Jersey Gas composition of dry natural gas that would be found in the proposed pipeline.

Typical Composition of Natural Gas

Methane	CH_4	90-95%
Ethane	C_2H_6	
Propane	C_3H_8	0-14%
Butane	C_4H_{10}	
Carbon Dioxide	CO_2	0-2%
Oxygen	O_2	0-0.2%
Nitrogen	N_2	2-4%
Hydrogen sulphide	H_2S	0-2%
Rare gases	A, He, Ne, Xe	trace

Based on the above, it is reasonable to conclude that in the unlikely event of a rupture of the gas pipeline, there would be minimal risk to the Kirkwood/Cohansey aquifer. Significant impact to the aquifer is unlikely because this proposed pipeline is for transporting only natural gas, which has no toxicity and no entrained liquids. This question was addressed in the application made to the Pinelands Commission, the NJDEP and US Army Corps of Engineers. Both the NDJEP and the US Army Corps of Engineers have approved permit applications for the construction and operation of the pipeline as proposed.

18. What number of stream crossings will occur as a result of the pipeline project? Is Mr. Ackers correct in his statement at the last P&I meeting that there will be 15 stream crossing? (See attached chart)? If not, why not. If correct, what method of construction will be utilized in these areas?

There are 16 stream crossings as a result of the pipeline project. All crossings would be installed using Trenchless Technology. The application submitted to the Pinelands includes a complete set of detailed plans that includes the number of streams being crossed. A complete wetland and open water field delineation was completed on the entire project route. The field delineation was reviewed in the field

by Pinelands staff, US Army Corps of Engineers staff and NJDEP staff. The persons doing the delineation and those representatives from the Federal and State agencies are all trained professionals with years of experience and certifications qualifying them to do this work. The details of the construction methods utilized to cross all these streams is presented in our application and shown on the plans submitted.

19. Is there an existing 24" pipeline on Route 50 that could be used for the repowering of the project? (See attached memo from commenter.) If not, please confirm the size and pressure of the existing pipeline already going through the Forest Area and which crosses Route 50 below Mays Landing.

The line in question is a 20-inch pipeline operating at 435 PSIG running from Union Road to NJ Rt. 50. It then enlarges to 24-inch pipeline that runs from NJ Rt 50 to Weymouth also at 435 PSIG. This line was the supply line for Alternate Route B in the Route Analysis prepared by Woodard & Curran and previously submitted to staff. This pipeline does have the required volume and pressures available to be used for the repowering of the plant. Use of this line significantly reduces the reliability aspect of the project. It would still be susceptible to the potential service interruption resulting in the loss of potentially 140,000 customers in Atlantic and Cape May Counties.

20. Why can't you place a pipeline beside the existing pipeline on Route 50 in order to meet the goals of the project?

This option was considered during the early planning stages of the project and discussed with staff. This option provides no reliability benefit to the customers in Cape May and Atlantic Counties. There is also risk that was considered associated with having significant gas transmission system assets in close proximity to one another. A service interruption impacting the 20-inch line servicing Cape May County could also result in an interruption on this line. As a result, this was not considered a viable option for the project.

System reliability is defined as "The reliability of an entire system, as opposed to the reliability of its components. The system reliability is defined by the reliability of the components as well as the way the components are arranged reliability-wise"[1]. Applying this definition and logic to the design of a natural gas system means you should try to have multiple independent gas supplies to the customers. It is for this basic reason that installing a new gas main down Route 50 alongside other gas mains was immediately discounted since it would not provide system supply options and redundancy.

Spoken from other analogies, many years ago a plane lost its hydraulic controls because both lines were right next to each other and an engine failure caused a component to sever both lines simultaneously. Similarly, a gas company started separating its regulator control lines to avoid a single accident to affect both lines simultaneously. If that was to occur, the gas system would have been over pressurized. A good design has multiple supplies and alternatives to maintain system integrity. Installing the new gas main down Route 49 provides another supply route to the Cape May area as well as avoiding Tuckahoe and providing the supply to the BL England plant. If another gas main is installed down Route 50, there is no true alternate supply for the Cape May area.

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[1] http://www.weibull.com/knowledge/rel_glossary.htm

Another example is when you are supplying a major customer off any system, and this is true in gas, water and electric systems, you look to provide alternate supplies. For example, you would install a main line valve with what is called a runaround. Thus you could supply the customer from either direction, providing the system is back-fed and capable of providing the required flow and pressure from either direction. In short, installing a gas main down Route 50 is like putting all your eggs in one basket. It simply does not provide system reliability and redundancy.

21. Provide an in depth explanation of how public utilities, specifically gas service, is provided in the State of New Jersey. What is the relationship between BPU and South Jersey Gas? How pervasive is BPU's regulation of the state's gas utilities?

In New Jersey, it is the exclusive responsibility of the NJ Board of Public Utilities to ensure that residents of the State enjoy safe, adequate and proper public utility service, including safe and reliable natural gas for heating homes and businesses. N.J.S.A. 48:2-13. The BPU is the only agency in the State of New Jersey charged with this responsibility and is the only agency vested with specific expertise to carry out this mission. The BPU fulfills this statutory responsibility by supervising and pervasively controlling the State's various public utilities, who are granted franchise rights to provide these essential services to the public. In essence, the BPU implements its mandate to ensure safe and reliable service to the public only through its franchisees—the State's public utilities. The Board's authority over public utilities is pervasive. Upon finding that a public utility has failed to provide safe, adequate and proper service to its customers, it may fire company employees and even direct that control of the company be entrusted to a custodial receiver. *See In I/M/O Allegations of Berkeley Water Company's General Dereliction of Duty to Provide Safe, Adequate and Proper Service*, BPU Docket No. 7811-1515 and 797-637, OAL Docket No. 2587-79.

The BPU has granted SJG a right to provide natural gas service within the southernmost seven counties in the State. The company provides essential gas service to approximately 360,000 homeowners and businesses customers and operates approximately 6200 miles of pipeline throughout its service territory. The privilege conferred to SJG to provide an essential service comes with an obligation to make sure that the service is safe and reliable and that all customers requesting service receive it subject to certain qualifications. All public utilities in the state, including SJG, are subject to the BPU's jurisdiction, including its control over their property, equipment and facilities. N.J.S.A. 48:2-13. The BPU regulates and controls most of SJG's operations including, but not limited to its service quality, customer service and billing practices, safety, construction specifications, accounting, financing and auditing.

The BPU's jurisdiction over SJG is extremely pervasive. Please see the answer to question 13. In essence pursuant to NJSA 48:2-13, the BPU is a regulator of general jurisdiction over SJG. That statute provides, in pertinent part:

> "The [B]oard shall have general supervision and regulation of an jurisdiction and control over all public utilities...and their property, property rights, equipment, facilities and franchises so far as may be necessary for the purpose of carrying out the provisions of this Title."

Indeed, there are very few actions of any significance which SJG may undertake without BPU approval. For example: SJG's rates may not be changed without Board approval (NJSA 48:2-21; NJAC14:1-5.12);

SJG may be ordered to provide safe, adequate and proper service (NJSA 48:2-23); SJG may not terminate customers, except in accordance with BPU regulations (NJSA 48:2-24; NJAC 14:3-3A.1 et seq.); SJG must get BPU approval to construct certain major pipelines, such as this one (NJSA 48:10-2 et seq; NJAC 14:7-1.4); SJG may not issue stocks, bonds or other evidence of indebtedness without Board approval (NJSA 48:3-9; NJAC 14:1-5.9); SJG may not mortgage its properties without Board approval (NJSA 48:3-7; NJAC 14:1-5.9): SJG may not abandon service without BPU approval (NJSA 48:2-24; NJAC 14:3-3A.1 et seq.); SJG may not close a customer service office without Board approval (NJAC 14:3-5.1); and SJG may not provide service in a new location without Board approval. (NJSA 48:2-27; NJAC 14:3-8.1 et seq.). There is an entire Subchapter of the New Jersey Administrative Code related to construction and installation of gas facilities (NJAC 14:6-1.1 et seq.). There is an entire Chapter of Title 48 of New Jersey Statutes Annotated related to gas companies. (NJSA 48:9-1 et seq.)