St. Lawrence Gas Company, Inc.

PROCEEDING ON MOTION OF THE COMMISSION AS TO THE RATES, CHARGES, RULES AND REGULATIONS OF ST. LAWRENCE GAS COMPANY, INC. REGARDING FRANKLIN AND ST. LAWRENCE COUNTIES EXPANSION PROJECT

Testimony and Exhibits of:

Construction Panel

Book 2

February 20, 2018

Submitted to:
New York State Public Service Commission
Case 18-G-____

Submitted by:
Harris Beach PLLC

NEW YORK STATE
PUBLIC SERVICE COMMISSION

PROCEEDING ON MOTION OF THE COMMISSION AS TO THE RATES, CHARGES, RULES AND REGULATIONS OF ST. LAWRENCE GAS COMPANY, INC. REGARDING FRANKLIN AND ST. LAWRENCE COUNTIES EXPANSION PROJECT

Case 18-G-______

DIRECT TESTIMONY OF
ST. LAWRENCE GAS COMPANY, INC.'S
CONSTRUCTION PANEL

DARREN J. WILSON
BRENT H. POIRIER
BRIAN DORWART

Q. Please state your full names, employer(s), business address(es), and current positions.

A. My name is Brent H Poirier. I am currently the Safety & Training Specialist for Enbridge St. Lawrence Gas Company, Inc. ("SLG" or the "Company"), which is located at 33 Stearns Street in Massena, New York. The Company is owned by Enbridge Gas Distribution, Inc. ("Enbridge").

My name is Darren J. Wilson. I am currently the Manager of Distribution Operations at SLG and have held that position for the last 7 years. As Mr. Poirier testified, the Company is located at 33 Stearns Street, Massena, New York.

Finally, my name is Brian C. Dorwart, P.E., P.G., and I am currently a Senior Consultant with Brierley Associates ("Brierley"). Brierley is located at 167 South River Road, Unit 8, Bedford, New Hampshire 03110.

Together, we represent the Company's "Construction Panel" in this matter.

Q. Mr. Poirier, please explain your educational background and work experience.

A. I graduated from Plattsburgh State University in 1987 with a Bachelors of Arts in Sociology and Environmental Science. My employment with SLG began in the summer of 1985 while I was still attending college. At that time, I was a temporary laborer, hired to assist the Company with a pipeline-armoring project at a river crossing in Massena, New York. I spent the next three summers as a seasonal temporary laborer while I continued my studies. During this time, my primary role was to support the Company's new capital construction crews and perform maintenance work on valves, mains, and services throughout SLG's service territory. In 1988, I accepted a full time position at SLG as a laborer in the Operations Construction and Maintenance division and spent most of that year learning the Company's in-house and field procedures. In 1989, I was promoted to Operations Supervisor of the Company's Ogdensburg depot, which is the portion of SLG that operates pipelines within its western district, including Ogdensburg, New York. I remained the Company's Operations Supervisor of the Ogdensburg depot for the next 24.5 years. During that time, my duties involved estimating, planning, and managing the installation of SLG's mains and services for new capital, reinforcement, and replacement projects. Some of my other duties as the Company's Operations Supervisor of the Ogdensburg depot involved supervising valve and leak surveys on both transmission and distribution lines, as well as maintenance follow-ups from survey findings. I was also charged with supervising utility service representatives with customer functions, such as meter replacements, inspections, utility locating, and emergency response, as well as the installation and maintenance of gas appliances. To a lesser extent, I provided assistance to managers and other supervisors with annual budget estimates for facility upgrades, tools, vehicles, and heavy equipment. I also provided guidance on employee development and training needs. From 1990-1995, I led the Company's five-year cast iron replacement program to eliminate all of the low-pressure plant systems in the Company's Ogdensburg distribution system.

In March 2013, I was elevated to Manager of Construction and Special Projects to assist the Company during our latest expansion effort into eastern portions of St. Lawrence County and Franklin County (the "Expansion Project" or the "Project"). By the time I transitioned into this role, the New York State Public Service Commission (the "Commission" or the "PSC") had already approved an Expansion Project budget of $41.2 million and construction of the 48-mile extra-high pressure distribution pipeline had been underway for approximately 6 months.

As the Manager of Construction and Special Projects, I became responsible for managing overall field operations work for the Expansion Project, including pipeline construction, field inspection, and data collection. I was also involved in ensuring all procedures, regulatory requirements, and the procedures and processes outlined in the Company's PSC-approved Environmental Management and Construction Plan ("EM

& CP”), were followed during construction of the Expansion Project. I also assisted SLG’s General Manager(s) in contractual matters and reviewing costs associated with the Project.

On February 6, 2017, my title changed to Training and Safety Specialist. In this role, I am now responsible for SLG’s safety initiatives, including developing and overseeing employee/contractor training programs, and ensuring operator qualification and quality assurance. I continue to have involvement with SLG employees and contractors that work on the Expansion Project, managing overall safety.

Q. Are you associated with any business or professional associations?

A. Yes. I am currently a member of the Northeast Gas Association’s (“NGA”) Operator Qualification Committee, Training and Qualification Committee, and I am a member of NGA’s QA/QC Inspection Practices Working Group. Also, I previously served for approximately 12 years on NGA’s Construction and Maintenance Committee.

Q. Have you previously submitted testimony before the Commission?

A. No. However, I have contributed to the content of testimony the Company has provided in the past.

Q. Similarly, Mr. Wilson, please explain your educational background and work experience.

A. I earned a Bachelor of Science degree in Mechanical Engineering from Clarkson University in 1990 and an Associate of Applied Science degree in Engineering Science from the State University of New York at Canton in 1988. I have been with the Company for 27 years, holding various positions in Operations. I was the Assistant Supervisor Technical for 2.5 years, Supervisor Measurement, Regulation & Corrosion for 18 years, and am currently the Manager Distribution Operations. During my tenure, I have been involved with multiple construction projects including: Note Keeper and Inspector, NPS8 extra-high pressure ("XHP") steel pipeline construction, Madrid to Canton (Megan-Racine Cogen Project) - 1990; Inspector, NPS8 XHP steel pipeline construction with horizontal directional drilling, Grasse River (Power City Partners Cogen Project) – 1991; Inspector, NPS12 XHP steel pipeline relocation, Massena (Walmart Project) – 1992; Environmental Inspector, NPS8 XHP steel pipeline construction with horizontal directional drilling, Edwards to Gouverneur (Natural Dam Cogen Project) – 1992; horizontal directional drilling ("HDD") Inspector, NPS20 XHP steel pipeline construction with HDD, Ottawa, ON (Ottawa River Project) – 1995; Project Manager and Inspector, NPS12 XHP steel pipeline in-line inspection retrofit, Massena

(12” ILI Retrofit Project) – 2011-2012. My involvement with the expansion into Franklin County is based on the fact that my departments are responsible for new construction, going forward, as well as operation and maintenance activities on all active gas facilities.

Q. Are you associated with any business or professional associations?

A. I was formerly a member of the American Society of Mechanical Engineers (ASME) as well as the National Association of Corrosion Engineers (NACE). I am currently an active member of the Northeast Gas Association, serving on or working with the following committees: Emergency Management Committee (Member), and New York Advisory Committee (Member).

Q. Have you previously submitted testimony before the Commission?

A. Yes. I provided testimony in Case 15-G-0382 on behalf of the Company.

Q. Mr. Dorwart, please provide your educational background.

A. I graduated from the University of Rochester in 1972 with a Bachelor of Art in Geology. Thereafter, in 1976, I returned to graduate school in Civil Engineering at the State University of New York at Buffalo before transferring to University of Massachusetts in 1978 to stay with my advisor who had accepted a new position. In 1979, I graduated from the University of Massachusetts with a MS in Civil Engineering, specializing in geotechnical engineering.

Q. Please provide a brief overview of your career.

A. I have 45 years of experience in construction, technical, and management of projects involving instrumentation, geotechnical engineering, and underground construction spanning High School to the present. These projects range from heavy construction of tunnels, dams, and highways, to light industrial building and machine foundations. I have been continuously employed as a Civil Engineer specialized in Geotechnical Engineering since June of 1979. Over my career I have specialized in directional drilling, tunnels, shoreline protection systems, and construction support services.

Q. You mentioned you have specialized in directional drilling. Please explain this area of your practice in more detail.

A. I have 25 years of experience working with horizontal directional drilling ("HDD"), including subsurface characterization, design, cost analyses, construction management, and forensics. My experience is both in-field and design-based. Also, I currently hold a second position as Project Engineer for Directional Project Support, a firm located in Magnolia, Texas, where I specialize in horizontal directional drilling design and construction for the gas and oil industry.

Q. Have you ever served as an expert witness?

A. Yes. I have served as an expert consultant and witness in litigation support for tunnels, directional drills, shoreline development, landslides, and forensic studies for geologic and geotechnical cases in jury trials, hearings, and before public boards.

Q. Have you ever testified before the Commission?

A. No.

Q. Do you have a resume that provides details regarding your project experience related to HDD?

A. Yes. You will find my resume attached to this panel's testimony as Exhibit __ [CP-1].

Q. Why are you participating in this panel on behalf of the Company?

A. Brierley was retained in December 2012 by Daman, the specialty HDD contractor for the Expansion Project, to assess damage to the eight-inch carrier pipe coating system on pipes that had been placed by HDD practices. Our initial work included two site visits and an assessment of the coating damage from two HDD installations. At that time, at least nine trenchless installations remained incomplete. Based on information developed from the site visits, St. Lawrence Gas requested that Brierley Associates provide a proposal to St. Lawrence Gas, through Daman, to develop a mitigation program for pipeline coating moving forward; the proposal was provided to the Company in early 2013. Brierley Associates continued supporting Daman with HDD design and consulting services for selected HDD installations through 2013. In late 2014, we were again retained by Daman and St. Lawrence Gas to consult on the Little Salmon River Crossing, which had encountered HDD construction issues associated with unexpected and unusual subsurface conditions. We offered field and consulting support on this crossing including additional subsurface explorations and interpretation of the subsurface conditions through the completion of this crossing.

Q. Did the Construction Panel receive assistance from anyone else in the preparation of this testimony?

A. Yes. The Construction Panel engaged in several discussions with Bernie Carvel, the former Manager, Special Projects, for the Company, to confirm certain events that took place at the beginning of the Project related to diligence efforts that no member of this panel was directly involved with.

Q. Does Mr. Carvel still work for the Company?

A. No. Mr. Carvel retired in June 2013 but was willing to provide the panelists with information regarding the due diligence efforts he and the Company conducted during the planning phase of the Project.

Q. What is the purpose of the Construction Panel's testimony in this proceeding?

A. The purpose of our testimony is to support SLG's filing by providing commentary and examples of the challenges the Company faced while it was expanding its natural gas service into the eastern portions of St. Lawrence County and Franklin County (the "Expansion Territory") and demonstrate how these difficulties significantly impacted the costs the Company incurred during the Expansion Project. Our testimony will be broken into several categories:

(1) A general overview of the Expansion Project, which is described in more detail in the accompanying testimony of former General Manager James Ward;

(2) A detailed description of certain events and circumstances that led to increased Expansion Project costs, including:

(a) Unpredictable ground conditions,

(b) Regulatory approvals and oversight, and

(c) Unforeseen additional inspection and testing expenses.

Q. Is this panel sponsoring any exhibits?

A. Yes. In addition to Mr. Dorwart's resume, our exhibits include:

1. Exhibit __ [CP-2] – Environmental Impacts Report
2. Exhibit __ [CP-3] – Documentation of Meetings with Highway Authorities
3. Exhibit __ [CP-4] – Results of Test Bores
4. Exhibit __ [CP-5] – Sample Contractor Bids Related to Ground Conditions
5. Exhibit __ [CP-6] – Ground Condition Extras
6. Exhibit __ [CP-7] – HDD Bores for Transmission Work
7. Exhibit __ [CP-8] – St. Mary's Cemetery Letter Report
8. Exhibit __ [CP-9] – Powercrete Test Results
9. Exhibit __ [CP-10] – Little Salmon River Bore "Extra" Costs
10. Exhibit __ [CP-11] – Inspection Summary
11. Exhibit __ [CP-12] – Odorant Summary

General Overview of Expansion Project

Q. Please provide a brief overview of the Expansion Project.

A. As also discussed in the Direct Testimony of James P. Ward submitted with this filing, construction of the Company's new 48-mile extra-high pressure pipeline (referred to herein as the "transmission line", the "pipeline," or the "line") began in August 2012. The Company intended to install the new line from the Company's legacy-system tie-in point in the Town of Norfolk, St. Lawrence County, to the Village of Chateaugay, Franklin County. Construction commenced after the PSC granted the Company's petition to amend its Certificate of Public Convenience and Necessity and approved the Company's revised estimated construction costs of $41.2 million in July 2012. The Project was divided into two phases: Phase I included the section of transmission line that would run from the Company's existing franchise in the Town of Norfolk to the Town of Malone, Franklin County, and Phase II encompassed the section of to-be-installed line that would run from the Town of Malone to the Town of Chateaugay, also in Franklin County.

Before construction commenced, and after a demanding request for proposal process, the Company hired Over & Under Construction, Inc. ("O&U") as the Company's main contractor for the Expansion Project. O&U was responsible for steel pipe installation, including trenching, rock removal, hauling, securing sand, stone and other miscellaneous materials, welding, coating, backfilling, and grading and testing for Phases I and II of the Project. In addition, SLG hired Daman as its HDD contractor to install certain portions of the transmission line that would be installed beneath roadways and waterways.

At the inception of construction, the Project's anticipated completion date was the end of 2013. As is described below, the Expansion Project was not completed on schedule, or on budget for several primary reasons, including the tough ground conditions encountered that impacted trenching and HDD operations and caused unforeseeable difficulties that required significant attention to ensure environmental prudency. Notwithstanding these setbacks, SLG and its contractors have completed the installation of a PSC-approved 47.64-mile line throughout the Expansion Territory).

The first 13 miles of transmission line and certain distribution lines were operational in November of 2013 and the remaining 34.64 miles of transmission line and certain distribution lines were energized in July 2015. The final length of the transmission line, broken down by pipe-size and related footage is depicted in the chart below:

Expansion final lengths	Footage	Miles
Total 8"	179,725	34.04
Total 6"	6,051	1.15
Total 4"	65,765	12.46
	251,541	47.64

Though the transmission line is now fully installed, the distribution lines have not been completely built-out. Thus, to reach the Company's goal of adding approximately an additional 3,000 customers, SLG needs to install: (1) 4 district stations in Franklin County, and (2) approximately 80 miles of distribution piping. This will allow the Company to install the required number of service lines (2,700) to service the forecasted additional customers.

Q. Based on your extensive construction and engineering experience, did St Lawrence Gas act reasonably and prudently in the construction of the Expansion Project?

A. Yes. Based on our experience, St Lawrence Gas performed or caused to be performed all typical diligence, sought appropriate proposals, and responded to changes in circumstance appropriately. The resulting changes discussed in our testimony were as a result of changes that were unknowable prior to the start of construction.

Q. You mentioned that the Commission approved a budget of $41.2 million in July 2012. How much has the Expansion Project cost the Company to date?

A. As of September 30, 2017, the Company has incurred $52,281,706 in costs associated with the Project. That is approximately $11.7 million of actual costs over the Commission-approved budget.

Q. Has the Company prepared a high-level breakdown of the cost overages by category?

A. Yes. A data bank summarizing the Company's costs associated with the Project is included in James P. Ward's testimony. Many of those costs are discussed below.

Q. Did the Company make an effort to keep Department of Public Service Staff apprised as it incurred unforeseen costs associated with the Project?

A. To our knowledge, the Company's then-General Manager James P. Ward had several in-person meetings and conference calls with DPS Staff throughout construction to discuss the progression of the Project and the associated cost overruns and difficulties encountered. Some of these meetings and discussions are detailed in the accompanying testimony of James P. Ward.

Specific Issues Encountered that Increased Costs of Expansion Project

Q. You mentioned that the Project was not completed on time or on budget, in part, due to ground conditions. Can you talk about those ground conditions and how they impacted Expansion Project costs?

A. Yes. Ground conditions such as wetlands, boulders, and consolidated rock had severe and detrimental impacts on our trenching and HDD operations, which increased Project costs and extended the timeline for both Project completion and attaching new customers in SLG's Expansion Territory. As is explained below, the rock and soil conditions encountered were extreme and wide-ranging and the delays associated with wetland areas that the Company needed to traverse were exacerbated throughout the course of construction by extremely wet and cold weather conditions.

Q. Did the Company's initial assessment and scoping of the Expansion Project identify the difficult ground conditions encountered?

A. Not to the extreme extent they were encountered once construction commenced.

Q. Did the Company conduct due diligence during the pre-construction portion of the Expansion Project to determine the ground conditions that would be encountered within the Expansion Project's right-of-way ("ROW") for both boring and trenching operations?

A. Absolutely. As is described in more detail below, the Company conducted visual inspections of the ROW, procured engineering and environmental studies of the construction area, including the ROW, participated in numerous meetings with local highway authorities to discuss ground conditions within the ROW, conducted test bores along the proposed transmission line route, and had contractors review the pipeline route before submitting job bids. These efforts were all taken to ensure that the Company selected the most efficient and cost effective pipeline route.

Q. Please briefly explain the visual inspection the Company performed of the potential routes for construction of the pipeline.

A. Company personnel performed walk-over visual inspections of the terrain along each route option. There were a few areas where large stones on the surface indicated that some degree of difficulty would likely be encountered to trench a pipeline within the selected ROW. However, those areas were limited to a very small percentage of the total route. The Company concluded after the visual inspection that nothing on the surface indicated the presence of rocks larger than what could be readily removed using typical trenching equipment.

Q. Please explain the engineering and environmental studies conducted at the inception of the Expansion Project.

A. As part of the requirements for the Article VII submission to the Commission, the Company engaged Environmental Design and Research ("EDR") to perform several studies of the proposed ROW. A resulting report was generated that included information on the geology and soil conditions and wetland delineation of the construction area. The resulting environmental impacts report is attached as Exhibit __ [CP-2]. Section 4.4 of the report, entitled "Topography, Geology and Soils," details the types of soils and conditions likely to be experienced in the pipeline project area (*see* Exhibit __ [CP-2], at 15-21). Tables 4-1 and 4-2 of the study indicate the soil associations and soil series in the study area (*id*, at 18-19). There is a reference to "very stony soils" in the Franklin County portion of the Project area (*id*, at 18). However, the majority of the issues involving rock in the trenching area were encountered in St. Lawrence County, where, according to the report, stony soil was not anticipated. In all areas, depth to bedrock was listed as greater than 60 inches and because trenching would lay the pipeline in the ground above 60 inches, this did not cause the Company to have major concerns.

When EDR subsequently completed the "Wetland Delineation Report," the entire proposed pipeline ROW was investigated to determine potential impacts to hydrological resources. EDR identified 142 wetlands and streams scattered along the pipeline route. Visual investigations and soil core samples were collected at each wetland/stream and included in the report. Although the core samples generally did not exceed 16 inches in depth, there was no indication of excessive rock along the footprint of the proposed pipeline.

Photographic evidence of the surface of these areas also did not indicate the abnormal rock quantity or size that was eventually encountered. Typically, when nested boulders are present, there is some evidence on the surface to indicate that condition.

Q. You mentioned the Company also held meetings with highway authority personnel. Please describe the purpose of these meetings.

A. From January to May of 2010, meetings were held between Company representatives and highway authorities from every jurisdiction affected by the Project (*see* Exhibit __ [CP-3]). Municipal highway departments, due to their maintenance and installation of roads, drainage systems, water systems, sewer systems, signs, etc., frequently (and over the course of many years) perform excavation throughout their respective municipalities and typically are aware of those areas that are difficult to trench. Among other topics, discussions included known areas of high water table and areas of known shallow bed rock or other obstacles to excavation that might be realized along our proposed pipeline route. Although a few areas of shallow bedrock were identified at these meetings, none were located near the planned pipeline route. Instead, the areas of shallow bedrock were more closely associated with the proposed distribution systems. Since distribution systems involve "networks" of pipe within a village or town, avoiding rock can easily be facilitated by moving from one side of a street to the other, or supplying an area from another street. Also, distribution mains are generally smaller in diameter and are plastic pipe, thus making routing alterations much easier.

Generally, the Company acquired useful information at these meetings and they did not raise any concerns about the ground conditions that the Company would ultimately encounter.

Q. Why did the Company perform test bores at the inception of the Project?

A. The HDD process is typically bid based on the soil conditions likely to be encountered during the installations. Thus, the Company requested prices from HDD contractors for the cost of boring through soil and a separate cost of boring through rock. The cost difference can be substantial between the two boring mediums. Therefore, prior to the HDD bidding process, the Company hired Northern Technical Services to perform test bores (completed between December 2009 and May 2010) at the proposed HDD installation sites to determine the ground conditions in order to more accurately estimate the cost of the bores as a part of the total project cost. A total of 24 test bores were completed (*see* Exhibit __ [CP-4], Schedule 1). The Company was also able to procure from the St. Lawrence County Highway Department copies of four test bores that were performed in 2008 for a recent bridge reconstruction project at the Plum Brook in Norfolk (*see* Exhibit __ [CP-4], Schedule 2). Review of the test bore logs, which were located at various sites along the route, found the shallowest indications of boulders or bedrock to be from five feet to nine feet in depth. These results prompted the Company to include quantities of HDD installation through rock in the Expansion Project cost estimate. Copies of the test bore results were also provided to the boring contractors as part of the RFP documents, allowing those contractors to bid and plan accordingly.

Q. When did prospective contractors review the pipeline route?

A. As is described further in the accompanying testimony of James P. Ward, the Company originally invited over 12 pipeline construction companies to bid on the Project. A pre-bid meeting was held in June of 2011 in Malone, after which the contractors were transported by bus to view the entire route of the Expansion Project. The contractors' representatives were then given the opportunity to perform their own walk-over inspection of the entire pipeline route.

Q. Why was this walk-through important?

A. In the process of narrowing down the bids, three contractors were asked to provide their own estimates for appurtenance items outlined in the contract, including the volume of rock excavation. These firms have years of experience building pipelines in New York State and throughout the northeastern United States. All three contractors provided their own estimates of rock excavation and the weighted average for those estimates was in line with the quantities that were used in the model (300 cubic yards, as discussed in the following question and answer) associated with construction cost estimates, based in part on their visual inspection of the site (*see* Exhibit __ [CP-5]). In addition to the volume of rock removal, the related estimated quantities provided by the contractors included "Granular/Select Fill" (sand used to replace the volume of rock removed from the trench line), and "Rock/Spoil Disposal Hauling." Although the contractor estimates for these appurtenances also fell in line with the Company's estimates, these appurtenance items ran well over budget due to the amount of rock ultimately encountered.

Q. Did the Company rely on these diligence efforts when it estimated the amount of consolidated rock that would likely be encountered during construction of the Expansion Project?

A. Yes. All of these due diligence actions depict the prudent steps that the Company took to obtain accurate estimates for the cost of the trenching and HDD operations necessary to complete the Expansion Project. In addition, the Company relied on its prior experience with pipeline projects in other portions of St. Lawrence and Lewis Counties to conservatively estimate that 300 cubic yards of consolidated[1] rock excavation would be required to construct the Expansion Project. This estimation was included in the financial model provided to the Commission during the Project's approval process. There were no other reasonable actions SLG could have taken during the diligence period to forecast the troubling ground conditions ultimately encountered.

Q. How much consolidated rock was actually removed during the project?

A. As is described below, due to unpredictable circumstances, the actual amount of consolidated rock removed on the project amounted to approximately 497 cubic yards, or 13,419 cubic feet. In addition, because of the unexpectedly large quantities of loose rock, cobble and boulders excavated along the pipeline route also had to be removed from the site and disposed of in approved disposal sites and the volume of that spoil had to be replaced with sand fill, purchased, delivered and placed in the trench. These efforts all added costs to the Expansion Project.

Q. How did initial estimates regarding ground conditions influence the planning of the Expansion Project?

A. The Company's ground condition evaluation during the pre-construction due diligence period was one of the factors that contributed to the

[1] When this panel refers to "consolidated" rock, it means rock that cannot be removed using the typical equipment necessary to excavate a trench.

selection of the Expansion Project's ROW. Other factors included vehicular traffic, long-term pipe protection from damage, access to the pipeline route for maintenance, and the length of the pipeline. After weighing these factors, SLG decided to construct the transmission line primarily along an abandoned railroad bed. Based on the Company's due diligence, the abandoned railroad bed accommodated all of the features the Company needed to complete the Expansion Project in a timely and efficient fashion. Moreover, the railroad bed provided a direct path for all but approximately 21 miles of the pipeline, including an 8 mile segment through the Town of Norfolk, 1 mile around Brushton, 1 mile through the Village of Malone, and a stretch along County Route 23 between the Towns of Burke and Chateaugay. In addition to influencing the selection of the route the pipeline would take, ground condition due diligence also impacted how the Company and its contractors estimated the trenching and HDD costs for the Expansion Project.

Unfortunately, the actual ground conditions were significantly more challenging and added unforeseen costs of approximately $1,135,000 for trenching related work and another approximately $2,440,000 for HDD related work. Attached hereto as Exhibit __ [CP-6] and Exhibit __ [CP-7] are cost spreadsheets that respectively show the planned costs for trenching and HDD related work and actual costs relative to those categories due to the ground conditions encountered.[2]

Q. Please explain in detail the rock conditions that the Company discovered during *trenching* operations and how those conditions affected the Company and its contractors' trenching cost estimates.

A. When construction of the line began in the Town of Norfolk in late August of 2012, the ground conditions for trenching were fair but worsened as the Company entered the ROW within the Town of Stockholm in September 2012.[3] Upon entering the railroad bed, it became evident that the amount and size of the rock beneath the surface was much greater than SLG or its contractors had anticipated. Given that the rock removal and excavation was significantly more extensive than expected, it triggered an increase in

[2] Additionally, there were HDD expenses involving environmental work, including timber mat mobilization, silt fencing and restoration efforts that stemmed from the wet and cold weather encountered during the Project, and inspection expenses, which are described, in part, below.

[3] Notably, in or around 2009, Company personnel met with the St. Lawrence County Highway Department Chief Engineer regarding pipeline construction within the St. Lawrence County highway ROW. The Company's preferred route at the time included approximately six miles within the ROW of County Route 49 in Norfolk and Stockholm, and approximately three miles within the ROW of County Route 52 in Lawrence and Brasher. Initially there was a verbal agreement that the Company could construct the pipeline sections along St. Lawrence County Highways within the roadway embankment, which would facilitate excavation since most of the soils involved in the trenching would be previously disturbed fill. Subsequently, the County Highway Engineer retired (2010), and his successor would not allow the Company to construct in the road embankment. Instead, he required that the pipeline be placed within three feet of the highway ROW's outer limit. This requirement resulted in moving the trench from previously disturbed fill to the undisturbed soils, where significant rock was encountered. It should also be noted that the Franklin County Highway Department did allow the Company to construct the pipeline along their roadways within the road embankment, resulting in considerably fewer issues with rock.

spoil hauling costs and generated the need for additional sand padding and the insertion of other select fill into and around the trenches.

The rock conditions on the Project were extraordinary in composition beyond the standard rock, clay, sand, and loam that would be anticipated in such terrain. For example, many of the areas along the ROW that had to be trenched, and housed boulders that ranged from three to seven feet in diameter, making it difficult to move and load material using conventional construction equipment. In many cases, the Company's contractors either had to break up the rock using hoe rams and then load them into trucks, or negotiate with property owners to leave the boulders piled to the side of our ROW boundaries. Moreover, due to the heavy rain and resulting water levels in these sensitive environmental areas, the Company had to determine a way to remove and store the excessive rocks found without disturbing the surrounding areas along the edge of the ROW.

The amount of unanticipated rock significantly slowed construction progress by limiting our workspace for pipe assembly, welding, x-ray, pipe coating, backfilling, and final restoration functions. The increased costs the Company incurred due to the unforeseen rock conditions within the trenching territory are depicted in Exhibit __ [CP-6].

Q. Mr. Dorwart, in your professional experience, can unforeseen rock conditions cause delays and increased costs on trenching portions of a project such as the Expansion Project?

A. Yes. Cost escalates significantly with the size of the rock, and less significantly with the amount. A six-foot diameter boulder has a volume four times greater than a three-foot diameter boulder, though the diameter is only twice. Boulders larger than three to four feet in diameter become expensive to move as they require additional moves from trench to temporary storage and processing to break the boulder suitable for haulage, then lifted into haulage vehicles instead of a single lift into a haulage vehicle for removal. Additionally, large, heavy boulders accelerate equipment damage (reduce life span), and require larger equipment (more expensive to maintain and operate) to move. Both factors significantly increase costs. Similarly, larger rocks require secondary site storage space adjacent to the trench operation for breaking and re-handling before leaving the trench site. Storage along a ROW also severely restricts transport along the ROW with resulting congestion slowing construction progress. Large boulders also result in over excavation as the footprint from the boulder typically extends outside of the pay limit. Thus, excess boulders result in excess excavation volume and backfill volume.

Q. Mr. Dorwart, aside from size, is there anything else about the rocks the Company encountered during the Expansion Project that caused difficulty?

A. Yes, the rocks in the area of the Expansion Project are harder than underlying sedimentary sandstone rock as they were glacially transported from Canadian igneous rock and older metamorphic rock sources. Additionally, portions of the underlying sandstone had been chemically altered over time by silica (quartz) replacing the much softer calcium carbonite ‘glue’ holding the sand grains together. Harder rock requires more energy and time to break into haulage sizes and increases in tool wear, thus is more costly.

Q. What other ground conditions did the Company encounter that contributed to cost or delays?

A. We encountered numerous wetlands that could not be trenched as planned for pipe installation due to heavy rain and snow in 2013, poor drainage resulting in ponding because of the thin soil cover above the rock, which resulted in limited groundwater storage capacity, and the re-emergence of water springs that were not identified during the diligence period. These factors resulted in environmental impacts that required mitigation by the use of HDD methods instead of the specified traditional trenching methods.

Water flow control was also a common challenge on many sections of the Expansion Project and often required contractors to stop work and devote additional resources to contain or divert water within the ROW, or dewater the ROW before pipe could be pulled or laid. This process required environmental mitigation by the Company in the form of additional proper erosion and sediment control materials, as well as the methods prescribed by Department of Environmental Conservation (the "DEC") to stabilize the pipeline route. Each average water issue encountered during the Expansion Project added one additional day of work to the Project's timeline. Additionally, each water issue – including heavier than usual rain and flooding during the spring of 2013 – required the Company to incur expenses to purchase additional materials that were not anticipated at the inception of the Project.[4]

Q. Mr. Dorwart, do you believe heavy precipitation caused the Company trouble during the Expansion Project?

A. Yes. Heavy precipitation is an issue in this area because of limited groundwater storage capacity. Initially, the glaciers removed the soil down to the bedrock surface and deposited a dense to very dense till consisting

[4] Examples of the materials the Company had to purchase to mitigate against excess water include: silt fences to contain water and silt from entering wetlands, streams, and agricultural land; grade stakes to anchor the silt fence; straw wattles to filter out suspended sediment and to retain surface runoff to avoid erosion; turbidity curtains to contain silt and turbidity in streams and rivers; straw bales; and sand bags.

of a heterogeneous mixture of soils grading from clay through cobbles and boulders. The till formed under several thousands of feet of ice resulting in a dense to very dense compaction and the wide range of soil sizes made the till relatively impermeable to vertical groundwater flow. However, the till thickness is relatively consistent and the layer followed the bedrock surface which formed depressions in areas where the softer zones of bedrock eroded faster than the harder rock zones. During the melting of the glaciers, a relatively loose granular material was deposited in a flowing water environment over the till filling in the till pockets and bringing up the ground surface to the relatively flat present day ground surface. The resulting conditions are till lined depressions filled with a variable layer of loose granular material.

The loose granular deposits above the till were placed in a flowing water environment that washed out much of the clay and silt making these deposits much more permeable than the till. However, this granular material has limited storage capacity as the layer is relatively thin (say 5 to 25 feet thick based on the test borings). Precipitation infiltrates into the relatively loose granular material until the shallow basins of loose granular material are filled to the ground surface. The drainage of these basins is controlled by the lowest elevation of the till surrounding a basin just like a pond or lake overflows once filled. The water flow is therefore in a lateral direction through the loose granular material. Once the groundwater surface reaches the ground surface, overland flow develops laterally on the ground surface along surface topographic low areas eventually forming streams. Limited storage capacity means that a limited amount of precipitation will fill these basins. The relatively flat surface topography limits the amount of water that can discharge by subsurface and surface lateral flow. The results are frequent wet areas forming wetlands above the till depressions that drain slowly resulting in saturated loose granular material that is far less stable than dry granular material. Additionally, once the basins are filled, they remain filled for extended periods of time as the basins are lined with relatively impermeable material, and lateral flow is slow though the soil or by overland flow crossing flat ground.

Q. Mr. Dorwart, are you aware of any other non-typical ground conditions that delayed this project?

A. Yes, it is my understanding that there were also other non-typical ground conditions that added delays and costs to the Expansion Project, such as private dump sites that contained lumber, steel, and household waste, as well as burial remains (collectively, "burial sites"). By way of example, Mr. Poirier was on scene when one of these burial sites was discovered in the Town of Bangor. It took the entire day to sift through the dumpsite and inspect what had been disturbed to ensure that no contaminants were present. On average, a day of cleaning a dumpsite like the one in the Town of Bangor cost the Company an entire day's worth of labor.

Additionally, in the Town of Malone, a trenching crew found an animal burial site behind a farm. During siting of the ROW, this particular site was vegetated and did not show signs of a previous excavation; however, the Company's contractor encountered the burial area once the trenching crew reached this location. This required additional time to clean up and, even more costly, the Contractor had to redirect previously installed pipe to the opposite side of the ROW to avoid the burial site.

Q. Mr. Wilson and Mr. Poirier, could you elaborate on these additional non-typical ground conditions encountered?

A. Yes. By way of example, the Project was challenged in the ROW location behind St Mary's Church in Brushton, New York. While the Company was selecting the pipeline ROW, the Company was verbally informed by the pastor that the cemetery behind this church had been relocated "a long time ago." Nonetheless, additional pre-work investigation of the site was performed by an environmental contractor, an archeological consultant, and the New York State Historic Preservation Office. Despite the remains of head stones and markers in the area, all of these consultants agreed that human remains were not likely to be present in the area of our ROW based on the mapping and other information provided by the church. This is a prime example of the Company taking all prudent steps prior to construction to estimate cost and construction type in each area.

Notwithstanding these efforts, just prior to the commencement of excavation at the St. Mary's Church cemetery, one resident in Brushton approached the Company and claimed that there were existing graves in the area of our ROW. Based on this warning, the Company decided to retain a consultant to perform a ground penetrating radar survey of our pipeline route before disturbing the site. The survey results confirmed that there were "grave like disturbances" within the ROW, but they could not identify if there were human remains within the area. To avoid disturbing potential gravesites, the Company decided to drill a 14-foot-deep HDD bore which placed our pipeline approximately 8 feet below the suspect graves sites, as shown in Exhibit __ [CP-8]. As a result, costs in this area exceeded estimates by approximately $73,000 due to the requirement to bore under the cemetery to avoid any possible contact with human remains. Despite this expense, the Company was prudent in its cost estimate and prudent in its mitigation plan to avoid human remains and other sensitive environmental areas.

Q. Did the above-mentioned ground conditions impact the HDD process or expenses?

A. Yes. The ground conditions, which significantly reduced the production rate, caused the Company to incur more than $2,400,000 in unforeseen HDD expenses. Unlike trenching where more and larger equipment can be mobilized to a work site to handle different subsurface conditions, the HDD process is like tunneling in that there is only one access point to the excavation face. Changing tooling has limited impact to the production rate, thus a major factor in HDD costs is the time it takes to advance the excavation face. As there is only one access to the face and the tooling and equipment remains relatively unchanged for project cost, the production rate tends to be the dominant factor in the total cost of constructing an HDD crossing. The change in production rates between optimal and marginal (silty sand vs. rock with cobbles and boulders) typically can be a factor of six to ten times per linear foot of installed carrier pipe. This factor correlates closely with a similar increase in construction time thus cost as production rates slow.

The tribulations the Company endured to surmount difficult drilling conditions and pull unplanned bores are outlined below.

Q. Before you describe those difficulties on a bore-by-bore basis, please provide a high-level outline of the bores the Company completed during the Expansion Project.

A. When Daman was retained as the HDD contractor for the Project, it was known that 18 bores would need to be completed in order to install the transmission line. Of these 18 bores, 8 were denoted as "wetland" bores, 3 involved drilling underneath riverbeds, 2 traversed beneath brooks, and 5 required Daman to drill beneath roadways because certain towns and the NYS Department of Transportation refused to grant the Company permission to trench the roadways. The 18 planned bores were:

#	BORE	SIZE	FOOTAGE PLANNED	LOCATION
1	CR 49 Swamp – Wetland 0B (Station 28+00)	8"	1200	Norfolk
2	Beaver Pond – Wetland 1A (Station 61+00)	8"	600	Norfolk
3	Plum Brook A (Station 126+00)	8"	400	Stockholm
4	Squeak Brook – Wetland 3C (Station 190+00)	8"	400	Stockholm
5	St. Regis River (Station 427)	8"	400	Stockholm
6	Wetland CC	8"	1200	Lawrence
7	Trout Brook Rt 11C – Wetland 10E (Station 620)	8"	700	Lawrence

Construction Panel (D. Wilson, B. Poirier, and B. Dorwart)

8	Allen Brook – Wetland 11B (Station 650+00)	8”	350	Lawrence
9	Deer River (Station 795+00), includes NY RT 11C Crossing	8”	400	Lawrence
10	RT52 – Wetland 15B + 15C (Station 888)	8”	2300	Brasher
11	Culvert Bore County Rt. 52 (Station 925+00)	8”	450	Brasher
12	Lawrence Brook – Wetland 19A (Station 1110)	8”	690	Moira
13	NY RT 95/CR 6 (Station 1138+00)	8”	75	Moira
14	Farrington Brook (Station 1235+00)	8”	400	Brushton
15	Little Salmon (Station 1255+00), includes CR 8/Delancy Ave	8”	600	Brushton
16	St Rt 37 Malone (Station 1800+00)	6”	75	Malone
17	Rt 11 Malone (Station 2040+00)	4”	100	Malone
18	Skinnerville Road	8”	100	Stockholm

16 of these 18 planned bores were ultimately completed.[5]

In addition, Daman and the Company's secondary HDD contractor, Todd Cable Construction, LLC ("Todd Cable"), completed 14 unplanned bores during the Project. The 14 unplanned bores were:

#	BORE	SIZE	ACTUAL FOOTAGE
1	Plum Brook B – Wetland 2B (Station 126+00)	8"	65
2	Rt 11C – Wetland 10C (Station 596)	8"	370
3	Rt 11C Swamp Bore – Wetland 12B	8"	1670
4	Trout Brook – Wetland 12B (Station 720+00)	8"	405
5	Rt 52 Culvert – Wetland 14A (Station 840)	8"	165
6	Wetland 23B (Station 1240+00)	8"	793
7	Brushton Cemetery (Station 1276+00)	8"	420
8	Wetland QQ (Station 1288+00)	8"	580
9	Wetland 28A (Station 1550)	8"	240
10	Co Rt 23 @ Vincent Rd (Station 2232+00)	4"	390
11	Alder Brook – Wetland 44A (Station 2298+00)	4"	305

[5] The Wetland CC bore was able to be relocated closer to the shoulder of the road and the dry conditions in that area allowed the Company to open trench this portion of the pipeline, avoiding the boring process at this location and saving the Company both time and money. Additionally, the Skinnerville Road bore was unsuccessful and the Company eventually obtained permission from the local municipality to trench across the roadway given the treacherous rock conditions beneath the road preventing a successful pipeline pull. Therefore, though there were 18 "planned" bores, only 16 of those bores were completed.

12	Wetland 45B (Station 2330+00)	4”	315
13	Selkirk Rd (Station 2350+00)	4”	280
14	Cemetery Road – Chateaugay (Station 4276+00)	4”	110

Of the 14 “unplanned” bores, 10 were denoted as “wetland” bores, 3 required the contractors to drill beneath roadways, and 1 required drilling beneath a cemetery. As is outlined in Exhibit __ [CP-7, Schedule 1], the Company spent $1,153,092.51 to pay the HDD drilling invoices and coating invoices for these unplanned bores. This cost total does not include inspection costs, environmental costs, restoration costs, etc.

At the beginning of the Project, the Company intended to trench in the areas where the 14 unplanned bores are now located. These areas were drilled instead for a variety of reasons, including rain levels in 2013 that resulted in unusually high water levels, which made it extremely difficult to trench without damaging or impacting the surrounding wetlands, and a road culvert protection along County Route 52, which at the time was handling significant drainage volumes.

Q. Returning to the conversation about the difficulties the Company encountered during the boring process, other than soil/ground conditions, were there other issues that contributed to additional costs for HDD operations?

A. Yes. The varying ground conditions caused problems with the pipeline coating SLG selected to use to complete the bores. As is outlined below, the original coating selected for the pipeline was insufficient to handle the extreme abrasiveness of the encountered ground terrain. The Company was forced to utilize several different pipeline coatings to complete successful pulls through the bores during the Expansion Project. Ultimately, the coating used on each specific bore was dependent on the ground conditions surrounding that bore. Simply put, one type of coating did not work on all of the bores involved in the Project as was originally projected. The coating issues faced by the Company and its HDD contractors, and the research SLG undertook to locate proper coating for the various ground conditions, caused the Expansion Project to take longer than expected to complete and cost the Company approximately $525,700.

Q. Please explain the process that the Company used to purchase the original coating for the pipeline.

A. Prior to construction, SLG had many discussions with our contractors and engineering group to review work sites in an effort to anticipate what materials and other equipment would need to be used during construction. With respect to the transmission line, the Company purchased two types of pipe coatings – one for trenching applications and one for HDD bores – that had been used for many years and were included in SLG's pipe specifications applicable prior to the commencement of construction of the Project. More specifically, the Company purchased Dura Bond X-Tec I for trenching applications and 14,000 feet of Dura Bond X-Tec II for bores.

By way of necessary background, the Company can only purchase pipe coatings that are included on Enbridge Gas Distribution, Inc.'s ("EGD") – SLG's parent company – approved specification sheet. At the time the initial pipeline was purchased for the Project, the Company believed that the Dura Bond X-Tec II was the best EGD-approved coating for boring applications.

Ultimately, the Dura Bond X-Tec I coating worked well for trenching applications. However, in mid-2012, after making these purchases, EGD modified its material specifications for HDD pipeline coatings and expressed concerns about the Company's intentions to use Dura Bond X-Tec II coating for the HDD bores. Ultimately, EGD advised SLG to use a Dura Bond fusion bonded epoxy ("FBE") coating for HDD applications to provide both corrosion protection as well as abrasion resistance during pullbacks. EGD believed that the FBE coating had better adhesion and would best protect the pipe during HDD work. Accordingly, the Company ordered 10,000 feet of 8" FBE for the HDD bores, which was delivered on July 19, 2012.[6]

Q. Did the FBE-coated pipe prove successful in HDD applications?

A. The FBE coating was only successful on one bore during the Expansion Project.

Q. Since FBE coating only worked for one bore, did the Company ultimately use multiple different types of pipe coating during the HDD process?

A. Yes. Because the 30 successful bores traversed many different types of ground conditions, – sand, solid rock, rolling boulders, etc. – different types of pipeline coating were required to achieve successful pipeline pulls. By the end of the Project, the Company used four different types of pipeline coating: (1) FBE, (2) FBE plus a coating of Powercrete, (3) high density polyethylene pipe ("HDPE") casing, which encapsulated the originally-ordered Dura-Bond X Tech II pipeline, and (4) a Kevlar sleeve that encapsulated previously ordered FBE pipeline. Each of the supplemental coatings provided additional abrasion resistance of some degree to protect the line against corrosion.

[6] At this time, the projected bores totaled just over 10,000 feet in length. By the end of the project, the bores totaled approximately 15,500 feet in length. In addition, approximately 1,500 feet of pipeline was utilized, but ultimately not installed due to scrapping or other damage incurred during the pulling process.

Q. When did the Company first discover that FBE pipe coating was not going to be sufficient for all of the different HDD ground terrains?

A. During the first bore of the Expansion Project. The first planned bore was a 100-foot road bore located beneath Skinnerville Road in the Town of Stockholm. Daman attempted to complete this bore for the first time towards the end of September 2012, shortly after construction of the Expansion Project commenced. During this pull, large sections of the FBE coating was stripped off the pipe by the relatively unstable hard cobbles, boulders, and sharp bedrock contacts such that the pipe's bare metal was exposed to during the pull. Daman decided that the ground conditions under this road – massive slabs of rock – were too difficult to attempt another drilling and pulling process. Instead, the Company obtained permission from the St. Lawrence County Highway Department to trench across the road to lay this section of the pipeline. This was the first difficulty encountered with the FBE coating during the boring process.

After this bore failure, SLG immediately shipped pieces of the FBE coating to an EGD engineer for testing and evaluation. After a review of the failed coating, and an analysis of the ground conditions encountered during the Skinnerville Road bore, EGD advised SLG that it should add an abrasion-resistant coating on top of the FBE for the remaining HDD work that involved rocky terrain since the FBE-only coated pipe was not going to withstand such ground conditions in the future. The cost incurred to test the stripped FBE pipeline, which took eight weeks to complete, was approximately $11,500.

The Company spent the next four weeks researching viable abrasion-resistant coating alternatives. On October 29, 2012, SLG decided to ship the 8” FBE pipe back to the manufacturer (Dura-Bond) to apply a 40-millimeter (0.04 inch) layer of an abrasion resistant coating called Powercrete, which is a liquid epoxy polymer concrete abrasion resistant overlay that provides great protection. This was the prudent course for the Company since the Powercrete could be added onto the FBE pipe that the Company had already invested in for the Expansion Project. Notwithstanding the fact that the Company was able to repurpose the FBE pipe, SLG still incurred a total of $136,824.00 in costs to purchase the Powercrete coating and ship the FBE pipe to and from the Dura Bond factory. The pipe was returned to SLG with the Powercrete coating on December 12, 2012. As soon as the Powercrete pipe was delivered, the Company and its HDD contractor began work on the Deer River bore before the winter season that would ultimately halt construction.

Q. Was the 8" pipeline coated with FBE plus Powercrete successful during future bores?

A. Yes. The 8" pipeline with Powercrete plus FBE coated pipe was successfully installed in 18 of the 23, 8" bores. These 18 bores had cohesive and coarse granular soils that did not breach the Powercrete coating. The 18, 8" bores completed with FBE plus Powercrete coated pipeline are:

Deer River (Station 795+00)	Wetland 23B (Station 1240+00)
Allen Brook - Wetland 11B - Station 650+00	Little Salmon (Station 1255+00)
Trout Brook - Wetland 12B - Station 720+00	Brushton Cemetery (Station 1276+00)
RT 11C Swamp Bore (Wetland 12B)	Trout Brook RT 11C - Wetland 10E (Station 620)
RT95 /CR 6 (Station 1138+00)	RT 11C - Wetland 10C (Station 596)
Lawrence Brook - Wetland 19A - Station 1110	RT52 Culvert - Wetland 14A (Station 840)
Culvert Bore County Rt. 52 (Sta 925+00)	RT52 - Wetland 15B + 15C (Station 888)
Farrington Brook (Station 1235+00)	Wetland 28A - Station 1550
Wetland QQ (Station 1288+00)	Plum Brook B – Wetland 2B (Station 126+00)

Q. What type of coating was used on the remaining 8" bores?

A. All 5 of the remaining 8" bores (CR 49 Swamp, Beaver Pond, Plum Brook A, Squeak Brook, and the St. Regis River) required HDPE casing to be installed over the pipe to protect it during the pulling process from large and unstable boulders that were encountered and could collapse onto the pipe during installation. These bores totaled nearly 2,900 feet.

Q. How did the company determine HDPE casing was necessary?

A. As was stated above, the first bore that the Company attempted with the FBE plus Powercrete-coated pipeline was the Deer River bore. Though the FBE plus Powercrete coating held up better than the FBE-only pipe did on the Skinnerville Road pull, it still allowed noticeable coating loss on the lead joint of the pull back as the abrasion capacity of the subsurface conditions was enhanced by instability of the HDD bores that resulted in boulders dropping onto the carrier pipe that caused much higher abrasion conditions than would occur by just pulling a carrier pipe through a stable but abrasive material hole. Daman believed that this coating loss was caused by sharp rock edges and boulder collapses in unstable ground located within the Deer River bore that would gouge through the pipeline. Though the coating loss on the Deer River bore was deemed acceptable through a “current requirement test,” the Company retained Berry Plastics to assist in the Company’s investigation into the effectiveness of FBE plus Powercrete coating when installing the pipeline within bores that involved unstable and rocky conditions. These research efforts were undertaken to mitigate coating failure or gouging of the pipeline, prevent work stoppage, and lessen repetitive costs to achieve several pipeline pulls due to the unanticipated extraordinary rocky conditions.

After discussing the coating process with Berry Plastics, SLG questioned whether the hardness of the Powercrete was proper and speculated that the new coating had not been fully cured due to the low temperatures experienced in the North Country during the early winter months of 2012 after the Powercrete was applied to the FBE-coated pipe. As research progressed, the Company also discussed using a plastic 12" HDPE as a protective sleeve for the pipeline in future wetland bores that had particularly difficult terrain. It was believed that the HDPE sleeve was tougher than the FBE/Powercrete combination and that this protective sleeve would act as a shield for unstable rock encroachment into the bore path on wetland bores thus mitigating the potential for loose cobble or boulders to roll back on to and damage the pipe. Ultimately, the Company determined that the HDPE sleeve would assist the Company in achieving its goal of completing the five swamp-like wetland bores without any damage at all to the pipe or coating.

To keep costs as low as possible, the Company decided to insert the 8" Dura Bond X-Tec II coated pipe inside the 12" HDPE sleeve and utilize this tougher coating providing a more robust abrasion resistant system on future wetland bores. The previously ordered 8" Dura Bond X-

Tec II pipeline was used within the HDPE casing as a cost saving measure as the 8" Powercrete + FBE coated pipeline was more expensive and it was unnecessary to have such durable coating on a pipe that was going to have an additional higher abrasion system by encapsulation within HDPE plastic.

After this decision was made, the Company ordered HDPE casing and then fused the 12" casing pipe lengths and removed the internal beads to allow the steel Dura Bond X-Tec II pipeline to be "stuffed" into the casing. This process ensured complete effective coating cover over the pipe and the pipe joints. It took SLG a significant amount of time to insert the carrier pipe into the plastic casing and increased our per foot installation costs as shown:

	Earth Bores cost per foot	Consolidate Rock Bores cost per foot
Original Bid Cost	$97.00 / per foot	$165.00 / per foot
Cost With casing	$137.00 / per foot	$296.00 / per foot

Q. What were the results of the research on the durability of the Powercrete coating that had been applied over the FBE pipe?

A. After significant testing, SLG determined that the Powercrete coating was sufficiently cured and the hardness of the coating proved to be very effective in subsequent rock-infested ground conditions. This was confirmed by both SLG's Senior Program Engineer who tested the coating using a Shore D durometer provided by Brierley Associates (an HDD planner for Daman) and the test results the Company received from the manufacturer of Powercrete. These test results certified the coating as being sufficiently cured. A copy of Powercrete's test results of the coating used during the Deer River bore is attached hereto as Exhibit __ [CP-9]. Because these test results were positive, the Company continued to use Powercrete + FBE coated pipeline on the bores with stable cohesive and granular soils.

Q What type of coating did the Company use for the bores involving smaller (4"-6") pipeline?

A To avoid purchasing and installing additional Powercrete coating, the Company researched other coating protection methods for the 4" bores. These bores were mostly road crossing and wetlands that were significantly drier than those that were drilled in the towns of Norfolk and Lawrence. Notwithstanding the drier conditions for these smaller bores, they were still rocky bore paths so the Company knew that the pipeline would need to be protected adequately to achieve successful pulls. The Company found and tested another protective shield for the smaller pipeline called Armadillo Kevlar Sleeves. Ultimately, two of the six, 4" bores were successfully pulled with Kevlar Sleeves protecting the pipeline

(Co RT 23 at Vincent Road and Cemetery Road). These 4” bores only took two to three days each to complete. The remaining 4” bores needed Powercrete pipe coating to traverse the terrain. As a result, the Company ordered 4” Powercrete pipe from Consolidated Pipe in September of 2013, at a cost of $13,095.00, before successfully completing the remaining 4” bores (Rt 11 Malone Crossing, Adler Brooke, Selkirk Road, and Wetland 45B).

There was only one successful 6” bore during the Expansion Project – NY RT 37 in Malone. The bore at NY Rt. 37 in Malone was completed with 6” FBE pipeline that was ordered in August of 2013 for a price of $5,240.00. The Company prudently chose to revert to the lower-cost FBE pipeline for this bore after it was determined that the bore was going to travel through a mostly sandy terrain that the FBE coating would be able to successfully navigate.[7]

[7] The August 2013 order of FBE included enough pipeline to complete an unplanned, and ultimately unsuccessful, bore in the Town of Malone – the Hilltop bore. The 6” Hilltop bore was supposed to be 350 feet in length. Due to the sandy conditions of the soil at the top of the hill, the Company’s contractors suggested that FBE pipeline be used for this bore. During the pull, the pipeline encountered a pocket of cobble in the middle of the bore path that created a significant longitudinal scrape on the bore exit. A Department of Public Service (“DPS”) inspector who was on site recommended that the Company not accept the pull and suggested repeating the pull with Powercrete pipe. At that time (around August 2013), the Company did not have any 6” Powercrete coated pipe and corrosion technicians were not available to test the coating on the pipeline for at least a week. To avoid further delay, the Company made a decision to open cut and trench the area to complete this section of 6” pipeline installation and continue progress on the project. Although this bore was unsuccessful, the Company incurred time and money to troubleshoot at this location. This unplanned bore was not included on the chart above listing the 16 unplanned bores for the project since this bore was unsuccessful.

Ultimately, coating issues caused delays in the boring process and required the Company to incur unplanned expense, not only to research alternative boring methodologies, but also to purchase multiple types of coating.

Q. In addition to obtaining the most effective coating for the pipeline based on the ground conditions, did the Company undertake any other efforts to increase the pace of construction of the transmission line?

A. Yes. The Company and its main HDD contractor, Daman, arranged to bring in other boring contractors to assist with the HDD process. For example, in March 2013, SLG contracted with Todd Cable to provide assistance in the completion of some remaining Phase I bores in Brasher, Lawrence, and Brushton and some planned, but incomplete, Phase II bores. Additionally, Daman brought in another HDD crew and hired two additional HDD subcontractors, Bore Tech LLC and Engineered Construction, Inc. (ECI), in an effort to speed up productivity on the wetland “swamp” bores that existed between Norfolk and North Lawrence (bores included: Beaver Pond, Wetland 2B – Plum Brook, Wetland 3C – Squeak Brooke, and St. Regis River). With these additional crews, the Company was able to energize the 13.5 miles of high-pressure distribution lines from the Town of Norfolk to North Lawrence in November 2013, which allowed the Company's first anchor customer to connect to SLG's service line.

Q. Did SLG have any additional issues with specific bores that increased costs of the Expansion Project?

A. Yes. There were three bores between the Farrington Brook and the Little Salmon River in Brushton, New York – the Farrington Brook bore, Wetland 23B bore, and the Little Salmon River bore – that caused significant Project delays. These bores were critical to the completion of the Expansion Project because this territory is downstream of North Lawrence, where the then-energized pipeline was located. As such, these bores determined when the Company would be able to complete installation of the transmission line and energize the remaining 35 miles of pipeline and service to the eastern Expansion Territory customers.

Q. At the time the Company began construction of these three bores, had the remainder of the 48-mile transmission line been installed?

A. Yes. At the time the Company began construction of these bores in and around December 2013, the entire 48-mile transmission line, aside from the pipe that would run within these three bores, had been completely installed.

Q. How long did it take to complete these bores and complete installation of the transmission line?

A. Unfortunately, due to issues that were encountered in Brushton, construction of these bores took almost 2 years[8] – far exceeding time expectations.

Q. Did these bores result in additional costs associated with the Project?

A. Yes. The additional costs associated with these HDDs represented the largest share of unforeseen costs for the entire Expansion Project.

Q. Did these three bores delay the schedule to energize the pipeline?

A. Yes. Given the significance of these bores and the Company's inability to provide customers east of North Lawrence with natural gas until their completion, the Company could not energize the remaining 35-miles of pipeline until late July 2015 after the Little Salmon River bore was complete.

Q. Was the Company able to isolate the cost of these three bores?

A. The Company knows that it paid its HDD contractors $1,221,067.33 to complete these three bores (*see* Exhibit __ [CP-7]).[9] However, this cost does not include the costs the Company incurred to, for example, inspect

[8] The first HDD, Wetland 23B was completed on April 26, 2014, the second, Farrington Brook, was completed on June 26, 2014, and the third, Little Salmon River, was not purged and energized until July 21, 2015.

[9] This figure includes the cost of the Powercrete coated pipe. The invoice cost for all three bores, minus the Powercrete coating, is $1,149,924.37.

this portion of the pipeline, or restore the grounds around the construction site.

Q. Before we discuss those three specific bores, did the Company prepare a cost summary for *all* of the bores that were completed during the Expansion Project?

A. Yes. Attached as Exhibit __ [CP-7] are two schedules that depict different summaries of the costs incurred to complete the bores. As with the three Brushton bores, these figures reflect the costs that the company paid to its HDD contractors to cover their invoices and the extra material costs related to coating issues discussed above. They do *not* include, for example, the costs the Company incurred to inspect the pipeline or to return the ground to its original condition.

Q. Please provide a description of the three Brushton bores.

A. To orient everyone to these three bores geographically, they are all located in Brushton, New York. Moving through Brushton in an easterly direction, you would first encounter the Farrington Brook bore. Next, is the Wetland 23B bore. Finally, further east in Brushton is the site of the Little Salmon River bore. As an aside, the two remaining bores in Brushton *east* of the Little Salmon River are the St. Mary's Church Cemetery and Wetland QQ.

Q. What bores were completed in Brushton first?

A. The two most easterly bores – St. Mary's Church and Wetland QQ were completed first.

Q. What did the Company do after those bores were completed?

A. After the two most easterly bores in Brushton were completed and the HDD crews were able to leave the St. Regis River bore site, clearing and timber mat placement was performed on Wetland 23B just east of Farrington Brook and west of the wetland itself.

At this time, the Company intended to trench the pipeline in this area.[10]

Thereafter, the HDD crews mobilized to Brushton and the initial preparation for drilling began at the Little Salmon River bore site. The pilot hole set-up for the Little Salmon River began to be drilled on November 6, 2013. Shortly after the pilot hole process began, an equipment failure occurred and the Little Salmon River drilling had to be halted until repairs were made in early January 2014. During this idle time, coating of the pipeline for the Little Salmon River bore, and the

[10] Notably, Wetland 23B was not a planned bore at the beginning of the Project. However, the Company was strongly persuaded – or directed – by DEC inspectors and an inspector from the DPS to bore this area instead of trenching as a "best management practice" or BMP). The environmental inspector also indicated that boring this section would eliminate clearing of trees in the highland area that was surrounded by the wetland. SLG ultimately agreed to bore this area.

stringing of that section, continued. Severe winter weather during this timeframe also slowed progress.[11]

In early January 2014, Daman restarted work at the Little Salmon River bore while ECI, a Daman subcontractor, was boring at the Wetland 23B bore. At the same time, pipe was being mobilized to Brushton where pipe stringing would begin for the Wetland 23B and Farrington Brook bores.

After a series of maintenance issues, freeze-ups, and a downhole collapse on the pilot drill that halted progress at the Little Salmon River, Daman decided to switch to the Farrington Brook bore and return to the Little Salmon River when the weather improved. Through mid-February 2014, Daman continued to look for a good drill path through the Farrington Brook, resulting in several failed attempts to drill the bore. At the same time, ECI continued to drill at the Wetland 23B bore site.

On February 18, 2014, the DEC arrived on site at the Wetland 23B bore and ordered the Company and its contractors to stop drilling until further notice due to concerns about the drilling slurry[12] being utilized.

---

[11] Extreme cold can slow down an HDD project because winter work can require up to 4 hours per day just in start and shutdown of the work, plus inefficient work due to weather impacts.

[12] Bentonite is an absorbent aluminum phyllosilicate clay. Bentonite expands when wet. At this stage, the substance is referred to as slurry and absorbs as much as several times its dry mass in water. Because of its excellent colloidal properties, it is often used in drilling mud for oil and gas wells and boreholes for pipelines. The property of swelling also makes sodium bentonite useful as a sealant, since it provides a self-sealing, low permeability barrier.

After two weeks' worth of testing the slurry, both in liquid and solid form, the Company's slurry was approved and contractors were given permission to continue drilling as long as they could store waste slurry in containers.[13] As a result, Daman had large tanks delivered to the site to collect extra excess waste slurry, along with additional heaters to heat the slurry tanks during the cold weather months. This allowed Daman to continue boring at the Farrington Brook site. Simultaneously, ECI's drilling of Wetland 23B continued with water instead of drilling slurry.

Q. Mr. Dorwart, were you at all surprised by the stoppage of work to test the Company's slurry?

A. Yes. This stoppage caused an unanticipated delay as the HDD process employed by the Company was traditional and the products it used are commonly used throughout the country including New York State. Stopping an HDD in unstable ground is known to add significant risk to a project as the hole may collapse resulting in the possible loss of the hole.

Q. Please continue your testimony regarding the boring process in Brushton, Mr. Poirier and Mr. Wilson.

A. Due to freezing temperatures towards the end of February 2014, waste and other products had to be removed from the site and all work was halted until March 3, 2014 when the temperature returned to 10 degrees or

[13] The Company's contractor for these tests was Atlantic Testing. Atlantic Testing subcontracted this testing work out to Pace Analytical Services, Inc.

higher. When the crews returned to Brushton, they began to work together to back ream the Wetland 23B bore. At this time, the remaining two bores in Brushton were on hold. After a slowdown due to several feet of snowfall, back reaming continued at the Wetland 23B bore into late March and daily removal of fluids from the drill string and cleaning equipment occurred to prevent it from freezing.

As back reaming continued into early April at the Wetland 23B bore, O&U began to restart operations at the Farrington Brook bore by installing a substantial amount of timber mats, setting rock sediment basins, and checking dams to control water flow. Timber mats were positioned on the west side of Farrington Brook to stabilize the road along the northern side of a farm field that had significant amount of water runoff due to melting snow in the field. ECI attempted its first pull of the pipeline at the Wetland 23B bore on April 17, 2014 but the pull head broke about half way through the pull. The pipe was removed from the bore and recoated where needed. To avoid a similar break, the HDD crew moved bridging, timber mats and other equipment, including the pipeline itself to the western side of the bore. After a few more days of attempted pipe pulls, the pull was completed on April 25, 2014 and ECI began to clean up the site and demobilizing the HDD equipment.

Once this bore was complete, the Company was shocked to learn that DPS environmental and safety inspectors ordered SLG to remove all of the trees above the bore in order to clear out access to the pipeline for possible future maintenance. The Company reminded the inspectors that the entire purpose of drilling this territory in the first instance was to *prevent* the clearing of trees in the highland area. This information did not cause the Commission's inspectors to alter their request and the Company was compelled to remove the trees from this area, again incurring additional expenses.

Q. After the Wetland 23B bore was completed, did the Company restart work at Farrington Brook?

A. Yes. On May 5, 2014, Daman restarted drilling at Farrington Brook with the assistance of O&U to position bore string across the brook to allow for a pull back. During the drilling efforts at Farrington Brook in May, crews were restoring land east of Wetland 23B and moving additional equipment to the Little Salmon River site. Drilling restarted at the Little Salmon River on May 28, 2014 and the crew attempted to find the previous bore path. The drill bit progressed 200 feet before it wore out and HDD progress came to a halt. A new bit and mud motor were shipped to the site to complete the final 400 feet of drilling through rock and 100 feet of drilling through soil. Ultimately, on June 26, 2014, the Farrington Brook pull back was completed, leaving the Little Salmon River bore to be the last bore preventing the energizing of the entire transmission line.

Q. Did the Company continue to encounter setbacks at the Little Salmon River bore?

A. Yes. Drilling at the Little Salmon River continued in early July 2014 after the installation of a new mud motor was complete. When drilling recommenced, Daman could not locate the original prior bore path so it had to begin drilling a new bore path. This caused continual problems with the drill bit given the rocky conditions of the riverbed. In fact, the drill bit was replaced several times and several different types of drilling heads (pilot and hole openers) were purchased and used for cutting through various rock formations during the month of July 2014.

Q. Mr. Dorwart, please provide information regarding the rock encountered during the Little Salmon River bore.

A. The rock contained seams of much harder than expected sandstone that was also heavily shattered by the glacier resulting in unstable conditions in the HDD drill path. This rock had been chemically altered by groundwater to contain a high quartz content forming a much higher strength rock which caused drill bits and other tools to wear out prematurely, both inside the tools from small amounts of abrasive quartz sand in the drill fluid and outside from cutter and “sandpaper” abrasion effects. These difficult conditions slowed penetration rates, which as previously discussed impacts HDD costs, which, in my experience, can increase cost in the range of 7 to 10 times higher in low penetration rate hard rock than higher penetration rate soil type materials.

Additionally, the highly fractured rock was unstable under drilling conditions resulting in failure of drill bits typically used for hard rock conditions. In summary of previous testimony, this cost increase is because fixed HDD per day costs are about the same no matter what is being drilled, so time is the major factor affecting cost per drill foot. Drill fluid loss is also an additional issue in these bedrock and nested cobble and boulder rock conditions in the vicinity of the river because of open cracks where leakage can occur. It would have been impossible to predict the location of open cracks and subsequent leakage quantities prior to beginning the drill in this area.

Q. After the Company obtained an appropriate drill bit in late July, how did drilling progress at the Little Salmon River?

A. Once the appropriate drill bit was isolated, drilling operations continued until early August when operations halted due to unexpected drill fluid loss that appeared downstream at Wetland WW (one of several small wetlands that was included in the larger, and extended, Little Salmon River bore). The 50 gallons of slurry that escaped during this unexpected drill fluid loss was promptly vacuumed and contained and there were no signs of leakage within the stream itself. As Mr. Dorwart mentioned above, it is believed that the ground conditions – here, specifically a pocket of gravel and cobbles – caused this unexpected drill fluid loss.

After this incident, the Company, Daman, and EDR met to discuss options moving forward and what drill bit and drilling procedures should be used to avoid repeat unexpected drill fluid loss. Also, Daman determined it was safest to pull back all rods and begin the bore in an entirely new path as the chance of sealing the large leakage path is typically very low in these situations.

Atlantic Testing provided samples of rock in alternative bore paths so that Daman could anticipate the ground conditions it would face on the west side of the Little Salmon River. This process assisted Daman in selecting the right type of drill bit and drilling procedures to cut through the remainder of the pilot bore.

By August 20, 2014 the drill was about 900 feet out – or 100 feet from the east side of the riverbed – and progress continued through the end of August. On September 5 2014, the Company encountered its next setback. As the contractor was moving forward with its drill, using water only – instead of Bore Gel since Daman had been pumping in about 1,000 gallons of slurry per day without returns indicating leakage of drill fluid from the hole – the owner of an old factory located upstream of the bore path, that was now used as more of a garage, reported a discharge of water from his water well. Drilling stopped.[14] The water spill was remediated, and the DEC and DPS inspectors connected to the project were informed of this unexpected water 'drill fluid' loss. Area residents were notified about the pressurized well and, although the residents who were home said that they were not affected by the pressurization, surveillance for drill fluid loss continued, and water samples were collected through the next day.

On September 9, 2014, the contractors held a meeting to discuss options for the completion of the Little Salmon River bore and, ultimately, the Company requested that Daman bring in a geological engineer to provide a drilling and remediation plan for the Company to complete this bore. Notably, while drilling operations were halted, Daman ordered a new drill, mud motor, and other materials, so that they were ready to go once operations could continue. It was at this time that our co-panelist, Brian Dorwart, prepared a "Continuation Plan" for the Company. As part of this plan, Mr. Dorwart obtained additional data to assess rock and fractures and redesigned the drill path to mitigate issues but explorations

[14] At the time drilling stopped the drill head had reached across the river and was positioned roughly 10 feet into the land portion of the west river bank, at a depth of about 22 feet below water level.

indicated that the drill was going to be of much higher difficultly and, thus, more costly. The Continuation Plan required Daman to reduce pressure within the bore to prevent future unexpected drill fluid leakage loss by using a second drilling machine to bore a relief hole that would allow reduction of ground pressures caused by the drilling process. A relief “vent” would be drilled roughly 25 feet down to intersect with the original bore path, east of Spring Grove Road. The relief vent would include a small steel pipe to pump out additional slurry from the hole and keep pressures low within the bore bath. Additionally, drill fluid pressure in the drill hole was measured and monitored in the area of the drill bit with the data being used to manage pressure in the hole to designed limits. Drilling resumed on September 15, 2014 using the Continuation Plan.

At that time, Daman and Brierley asked to drill using air hammers and foam, which they believed would maintain the hole open long enough to install the suction pipe. DEC inspectors refused to allow the Company to drill using foam slurry or use an air hammer. Since air hammers were not an option, Mr. Dorwart modified the Continuation Plan over the next several days and recommended the use of a vent/suction pipe that would be installed over the drilling rods in an area where the hole continued to be unstable and would collapse. This process required an 8” hole opening drilled down about 160 feet, and then the placement of a 2” steel conduit into the casing to pump the drill fluid to a lower surface elevation resulting in lower pressure in the drill hole. This process was completed and the reduction relief vent was operational on September 18, 2014.

Q. After the reduction relief vent was operational, how did the boring process progress at the Little Salmon River?

A. Drilling, reaming, welding, and casing installation continued slowly through the end of September, utilizing several different size hole openings to achieve forward progress. Notably, pressure transducers located in the drill steering instrumentation by the drill bit measured two to five pounds lower than the previous levels before the installation of the relief vents. Within a matter of days, the contractor had installed 44 rods of pipe into the bore path without issue.

Then, in early October, during 10” pipe casing installation, a large boulder fell onto the steel and obstructed the crew from installing further casing. Although the obstruction was cleared[15] with a reamer bit, the casing became stuck on a rock surface near a bend in the bore path. Inspection camera equipment identified an obstruction at the bottom of the casing. To clear this obstruction, the HDD contractor requested 160’ of

[15] This “obstruction” is a product of nested cobbles and boulders that do not have fine grained material assisting in the support of the boulders thus then can become unstable during drilling and move. This movement may pin drilling equipment. This movement is not the result of improper drilling but a natural condition in the ground that reacted to the drilling process in a negative manner.

heavy wall 8” steel pipe to create a telescoping section of pipe and a fabricated pan head to lift the pipe enough to slide a 10” casing over the 8 inch pipe to support the obstruction and free the drill rods to the bottom of the entry bore. Drilling was delayed for several days while Daman cleared the obstruction.

On October 8, 2014, after crews were able to clear the obstruction, the crew only advanced the casing 18-inches before the drive head on the drill broke. After the drive head was replaced and casing installs were complete, the contractor spent time removing gravel and stones from the bottom of the bore hole that collected during the installation of the casing. This process took several working days. By late October, Daman had resumed moving the pilot drill forward when it experienced significant pressure on the west bank of the river. This excess pressure caused the Brierley engineer to request that the Company bring in a well driller to provide well bores on the west bank of the river so that the pressure could be controlled to design levels. The higher pressure was caused by additional collapse of the HDD hole at locations that could not be reached by extending the casing further from the drill rig. The collapse obstructed drill fluid returns thus increasing the hydraulic pressure along the drill path between the collapse and the drill bit.

On October 29, 2014, the well driller – Wood Well Drilling – completed two wells but neither was successful at hitting the drill path hole. Later that day, a third well was installed which did intersect the bore path by design, resulting in the unexpected release of nearly 8,000 gallons of pressurized drill fluid. The DEC was notified of this, and all other releases of any size. This release resulted in subsequent significant reduction in the pressure in the HDD hole thus restoring control of the drill fluid pressure in the hole.[16] The Company obtained vacuum trucks and sand bags as soon as possible, but, fluid came out of the casing and vent pipes and uncollected mud escaped down local streets. The construction crews were forced to spend several days' worth of time containing the mud using silt fence and straw bales. The Company installed a large, lined container next to the relief well so that when drilling operations resumed, slurry could be pumped into the container and stored until the vacuum trucks returned the slurry to the recycler or disposed of it at an approved dumpsite. By successfully inducing slurry returns to the surface, Daman substantially reduced the risk of inadvertent returns into nearby water sources. This decision also helped remove rock cuttings and debris from the pilot bore, better stabilizing the hole and

[16] We did not expect the high return volume of trapped fluids which required cleanup. This was the result of hydraulic jacking open cracks in the rock to permit storage then gravity pushing the stored fluid back to the surface in the drilled well until the ground subsided and became stable again. This is unusual in ground with open fractures that promote leakage.

further enabling a successful bore of the river. Drilling resumed late in the day on November 2, 2014 and two additional vacuum trucks were brought to the site from Perras Companies to keep up with the mud returns during drilling.

Drilling continued on and off over the winter months as drilling was interrupted due to the cold weather. At other times drilling was interrupted by large boulders obstructing the bore or breaking the drill bit. By the spring of 2015, the Company had incurred significant Project delays due to weather, ground conditions, rock complications, and constant due diligence meetings to ensure safe drilling and protection of the pipeline. However, progress continued, though slowly until the 8" pipe was successfully pulled through at Little Salmon River on June 13, 2015. Thereafter, O&U crews made final welds to tie in both stretches of pipeline from North Lawrence to Brushton and Brushton to Malone.

Q. Is there anything else the panel would like to explain regarding the Little Salmon River Bore?

A. Yes. At this time, we believed it is important to explain that the Little Salmon River bore was initially planned to extend only about 150 feet on either side of the river. However, because DEC inspectors and other stakeholders (*i.e.* land owners) objected to the Company trenching the land to the east of the Little Salmon River, which would have required the removal of sugar maple trees, the Company ended up extending this bore nearly 1,000 extra feet to the east. This additional massive bore cost the Company time and money. And, similar to the Wetland 23B bore area, the DPS's inspectors ultimately required the Company to deforest the sugar maples above this extended bore path.

Q. In sum, after all of these delays and efforts, how much money did the Company pay its HDD contractors to complete the three bores in Brushton?

A. The Company paid its HDD contractors a total of $1,221,067.33 to complete these three bores, not including approximately $650,000 to purchase timber mats, silt fence, straw wattles, and grade stakes which were required due to the tremendous rainfall and snow during the 2013-2014 winter season, inspection costs, and other ancillary expenses related to the installation of the pipeline.

Q. Do you have a total cost figure for the Little Salmon River bore, including costs that the Company incurred above and beyond HDD contractor invoices and extra materials costs related to coatings?

A. Yes. In total, that bore cost the Company $1,320,324.76. The breakdown of the expenses incurred beyond HDD invoices and coating materials, valued at $559,755.19, can be viewed at Exhibit __ [CP-10]).

Q. When was the transmission line fully energized?

A. Within a few weeks of completing the Little Salmon River bore, the Company was able to energize the remaining 35-miles of pipeline. On July 27, 2015, another anchor customer began receiving its natural gas service.

Q. At the time this anchor customer was energized, was there any work remaining on the distribution portion of the Expansion Project?

A. Yes. Additional service and mains needed to be installed before the Company could provide service to all of its targeted customers. By July 2015, the Company had installed over 20 miles of distribution mains, 514 services, and 8 District Regulator stations to serve customers in Stockholm/Brasher, North Lawrence, Village of Brushton, Village of Malone, and Village of Chateaugay. In 2016, the Company installed another mile of main along with 26 services, justified by a profitability index above one. Presently, the Company has plans for further expansion of the distribution portion of the Expansion Project in order to reach a larger number of potential customers.

Q. How much money does the Company estimate it will need to complete the build-out of the distribution system to maximize customer additions within the Expansion Territory?

A. Approximately $18.6 million.

Q. The panel mentioned earlier that there were also unforeseen and unanticipated additional inspection and testing expenses incurred during the Expansion Project. How much money did the Company spend on inspection and testing during the course of the project?

A. To date, the Company has incurred nearly $4.76 million[17] in inspection and testing expenses (*see* Exhibit __ [CP-11]).

Q. What type of inspections did the Company have to perform?

A. The Company was required to perform general inspection of all project activities, welding inspection (both visual and non-destructive (x-ray/radiographic), inspection of safety-related activities, and environmental-related inspection.

Q. Did the Company budget for these expenses?

A. Yes.

Q. How?

A. The Company knew at the inception of the Project that its parent company required it to inspect 100% of the welds with x-ray equipment. Thus, our inspection budget forecasted for this expense based on the projected timeline and length of the pipe. After analyzing regulations governing

[17] This figure excludes the approximately $210,000 the company spent on environmental oversight while working on the Little Salmon River. In brief, the Company hired a full-time EDR inspector due to an environmental permit that required an inspector to be on site when the Company was working around wetlands or other protected areas during HDD work. As a result of this requirement, every delay encountered at the Little Salmon River extended the time that the Company had to pay the EDR inspector.

pipeline safety and consistent with past practice, and because the Company's ROW was predominantly in rural areas, the Company anticipated and budgeted to perform visual inspections on not less than 20% of the welds throughout construction. Thus, the Company budgeted to use two pipeline inspectors with visual inspection certification, as well as two note keepers to work with each inspector.

Q. Did your x-ray inspection plans change throughout construction?

A. The plan did not change. The Company inspected 100% of the welds performed with x-ray equipment. However, the cost for these inspections exceeded expectations.

Q. Why?

A. As discussed above, the ground conditions often interfered with the installation of the pipeline and many times the pipeline would be installed (via HDD) and have to be pulled back and taken apart. The delays in construction not only increased the number of welds that had to be inspected with x-ray equipment, it also increased the length of time that the Company had to pay for the x-ray inspectors and equipment to be on site.

Q. What about visual inspections – did your plans to visually inspect around 20% of the welds change during the course of construction?

A. Yes. On August 1, 2012, the Company held a pre-construction meeting to review the construction plan with all of the Company's contractors and certain DPS Staff ("Staff") representatives. During this meeting, the Company understood Staff to suggest that visual inspection was required on 100% of the welds performed on the pipeline. This suggestion was inconsistent with past-practice of the Company that had been approved by Staff and made notwithstanding the fact that Staff was aware the Company was going to use x-ray equipment to inspect each weld. Though the Company pushed back at this directive, the Staff member would not yield. Therefore, to comply with this directive, the Company had to hire two additional visual inspectors (twice the amount of inspectors budgeted for) to monitor the rest of the work taking place on the construction spreads to ensure visual inspection of 100% of the welds.

Q. Is this panel prepared to discuss any additional areas of work that caused the Project to exceed estimated expenses?

A. Yes. We will briefly discuss the cost overruns related to odorant conditioning, or "pickling."

Q. Please describe the costs the Company incurred related to odorant conditioning.

A. The Company began to incur costs for odorant in November 2013 after it energized the main transmission line from Norfolk to an anchor customer in the Town of Lawrence. Originally, the costs associated with the pickling process were included in the estimated expenses for installation. Based on past projects, the Company anticipated that the odorant process would take about two weeks to complete between purging and odorizing for the entire pipeline. However, due to the delays in construction, particularly in Brushton, the Company decided it needed to energize the pipeline in segments, beginning with the 15.5 mile segment from Norfolk to the Town of Lawrence. The Company utilized an odorant contractor, Midland Resource Recovery ("MRR"), to provide mercaptan and labor to assist in the odorizing process. Once a decision to only energize a portion of the pipeline was made, the Company and MRR planned to provide odorized gas to four of the district stations, Stockholm, Brasher, and two in North Lawrence. This would allow service to be provided to the anchor customer, the Brasher Falls School District, and to as many of the 104 residential locations with gas services already installed.

As the Commission is aware, odorant conditioning or "pickling" of steel pipelines is facilitated and optimized if the velocity of the flowing gas is relatively high, such that odorant is carried from its source to the end of the pipeline while being distributed and absorbed along the pipe walls. To accomplish this, the Company regulated pressures (45 PSI) from the temporary odorizer at the Norfolk tie-in area and used the anchor customer’s consumption rate of 10 MCFH to flow the gas downstream to support conditioning to North Lawrence. Ultimately, our goal was to turn on as many customers as we could once odorant had stabilized. Because the Company was unable to use the anchor customer’s consumption until odorant levels in North Lawrence were stabilized, SLG purchased two large construction heaters and rented two additional units to help migrate odorant down the 15.5-mile section of pipeline. Purging and energizing took place on November 19, 2013 and the anchor customer began trial usage on November 26, 2013.

The Company’s crews needed to monitor pressures and odorant levels from November 20-27, to ensure that the pipe was odorized during the startup phase for the anchor customer. The anchor customer began normal operations on November 28th and provided enough flow to stabilize the concentrations in the pipe at around 2.5 ppm. Thereafter, on January 1, 2014, the St. Lawrence School began normal usage for heating. By the end of 2014, 140 customers were using natural gas between the townships of Stockholm, Brasher, and Lawrence. Perhaps as a result of the increased usage, SLG noticed many fluctuations in odorant between December 2013 and March of 2014. More specifically, the odorant showed higher concentrations near the injection sites and significantly lower near the end of the pipe at the anchor customer. The Company continued monitoring the levels every third day for stabilization and, by April 2014, we saw a trend that concentrations were leveling out, showing consistent readings between Stockholm and North Lawrence.

On June 23, 2014, the Company turned off the injection system to test if the concentrations would continue at the same level utilizing only the pre-odorized gas (at 1.8 ppm) from the 10-inch legacy mainline that feeds the new expansion pipeline in Norfolk. By mid-July 2014, the Company discovered that odorant concentrations had dropped due to higher temperatures which led to lower gas consumption and flow rates. Therefore, it needed to take measures to mitigate odorant fade. As a result, we restarted injections of odorant on July 16, 2014 to increase concentrations back to the 1 ppm level and increased monitoring to ensure that we had sufficient odorant to the customers, readily detectable at 0.5% gas in air.

On November 23, 2014, odorant concentration returned to 1 ppm at the anchor customer, after 11 weeks of conditioning. The length of time that passed before odorant concentrations returned to 1 ppm indicated that there were other issues that could be slowing the conditioning process. The Company identified those issues:

- Due to delays at the inception of the Project, by the time the Company started construction, the pipeline had been exposed to weather and temperatures for 11 to 12 months. This exposure was long enough to allow some moisture and surface oxidation within the pipe. This exposure likely slowed the conditioning process.
- Pigging efforts on the first section of the pipeline did not remove all of the moisture or debris that reacts to the odorant. As a result, the Company pushed our contractor to provide 3 times more pigging on the second segment than what was completed on the first segment of the pipe from Norfolk to North Lawrence.
- The Company’s anchor customers consumed less gas than the Company expected. This slower usage had a direct impact on odor fade when temperatures increased and consumption slowed, allowing the mercaptan to react with the pipe wall much longer, reducing its effectiveness.
- Finally, the Company asked for an increased drying cycle using a larger desiccant dryer for a longer period following the minimum reading of -40 Degrees and ensured a 100 psi nitrogen fill within

the pipeline after cleaning the interior of the pipe moving forward with the second segment.

After the remaining portions of the Project were tied-in and energized, the Company was able to set up some injection points at Malone West, Malone East, and Chateaugay to help condition the pipeline. Over time, as usage increased odorant levels became more and more consistent. The Company continues to inject supplemental odorant into the expansion pipeline, regularly monitoring downstream levels. This should not be required once the build-out is complete and anticipated customers are captured, as additional load/flow will promote more efficient distribution of the already odorized gas through the system.

Q. How much has the Company spent on materials to odorize the pipeline?

A. As of July 2017, the Company has spent approximately $430,000.00 on rental equipment, including heaters and a dryer, since November 2013. Attached hereto as Exhibit __ [CP-12] is a spreadsheet outlining the costs associated with odorizing the pipeline.

Q. Taking into consideration all of the difficulties and setbacks described above, what is the value of the cost overruns that the Company has incurred?

A. As of September 31, 2017, actual cost overruns are approximately $11.7 million.

Q. Notwithstanding these cost overruns, did the Company act prudently in energizing the new transmission line?

A. Yes, we believe it did.

Q. Does this complete your testimony?

A. Yes, it does.