STATE OF NEW HAMPSHIRE SITE EVALUATION COMMITTEE

DOCKET NO. 2015-06

JOINT APPLICATION OF NORTHERN PASS TRANSMISSION, LLC AND PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE D/B/A EVERSOURCE ENERGY FOR A CERTIFICATE OF SITE AND FACILITY

PREFILED SUPPLEMENTAL TESTIMONY OF

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ON BEHALF OF COUNSEL FOR THE PUBLIC

April 17, 2017

1 Q. Please state your name, position and your employer. 2 A. My name is Adam Zysk. I am a Senior Site/Civil Engineer with Dewberry, which is a 3 multi-disciplinary engineering firm with offices in 18 states and headquartered in Fairfax, 4 Virginia. 5 Q. Please summarize your education background and employment experience. 6 A. I have a Bachelor of Science in Civil Engineering from the University of Rhode Island. I 7 am a Registered Professional Engineer in Massachusetts, Connecticut and Rhode Island. 8 Q. Have you testified previously before the New Hampshire Site Evaluation Committee 9 or other regulatory bodies? 10 I have previously submitted pre-filed testimony and written testimony regarding this A. 11 project. 12 **Q**. What is the purpose of your testimony? A. My testimony here discusses short and long-term impacts on New Hampshire 13 14 communities from the construction of select elements of the underground portion of the 15 proposed Northern Pass Transmission project (the "Project") along with the impacts of 16 project requirements issued by regulating authorities. These include waste heat generated 17 by the transmission of electricity through the cables, differential settlement in roads 18 where the Project is located, regulatory conditions and Project schedule 19 Q. Please describe the short and long term impacts of the waste heat generated by the 20 cable proposed for the underground portions of the Project. 21 A number of questions have been raised regarding the thermal impact of the proposed A. 22 underground cables. It has been acknowledged by the Applicants that a byproduct of the 23 transmission process will be heat generated due to the resistance to the flow of energy 24 provided by the cables. Among the issues raised is what the impact of that waste heat 25 will be on the roads under which the cables are installed. 26 27 A report prepared by Geotherm USA for PAR Electrical Contractors and issued on 28 November 16, 2016, provides information regarding the amount of heat generated by the 29 proposed cables. In summary, the design conductor temperature is 70° Celsius (158°

- Fahrenheit). The report indicates that this is equivalent to a heat output of ~ 50 W/m or 2 ~15W/ft.
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4 The Geotherm report also describes a number of soil parameters that impact the ability of 5 the material surrounding the buried cables to dissipate the generated waste heat. These 6 factors include the soil composition, texture, water content, density and organic content. 7 The report also notes that the flowable thermal backfill ("FTB") proposed as backfill in 8 all trenches has a relatively low thermal resistivity. It is for this reason that the Project 9 has opted to use this at all location of buried lines to more quickly draw heat from the 10 buried lines.

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12 The report states an assumed shallowest depth of cover over the conduits of 51 inches. The New Hampshire Department of Transportation ("NHDOT") has issued draft 13 14 conditions for this project which specify, among other items, the minimum burial depth 15 of the proposed facilities. Draft condition number 14 notes that the minimum depth of 16 cover for conduit burial under a Tier 3 and 4 highway is specified as 46 inches and under 17 a Tier 2 highway this depth is specified at 59 inches. Condition 14 also notes that this 18 depth is measured to the top of the FTB so the actual depth of cover over the conduits 19 should be greater than those minimums.

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21 Given the NHDOT prescribed burial depths for Tier 2, 3 and 4 highways, along with their 22 requirement to monitor the pavement following construction and repair any deficiencies, 23 it is reasonably unlikely that the heat output of the cables will create substantial long term 24 damage to the roadway pavement structure. This is, in part, based on the composition of 25 the pavement box (the layers of asphalt and gravel that form the road) and the ability of 26 that material to contain the waste heat to a depth where it will not impact the road 27 surface.

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29 This is most likely not the case with Tier 5 and 6 highways. These roads tend to be 30 unpaved and topped with either gravel or soil and may not be cleared for passage at all

1 times during the year. More importantly, Tier 5 and 6 roads are often not under the 2 jurisdiction of the NHDOT but are usually overseen by the municipality in which they are 3 located and, as such, NHDOT construction requirements may not be applied to, or 4 required for, these roads. There is a strong possibility that where the Applicants are 5 proposing to install underground conduits along Tier 5 or 6 roads, the minimum bury 6 depths described above may not be adhered to during the construction process. This is likely to have long-term impacts on these roadways. This long-term impact will probably 7 8 be most evident during the winter months.

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10 Many of the roads that are included in the Tier 5 and 6 category are susceptible to annual 11 freezing during the winter. The cold temperatures create a stable road surface that 12 extends several feet below the road surface. This stable surface can be travelled over by 13 certain vehicles which allows the road to be used. In the spring the frozen section thaws 14 and the road condition is poor for a fairly short period of time while the warmer temperatures and drier conditions dry the road, sometimes referred to as 'mud season.' 15 16 It is during this short period of time when damage is done to the road either by passing 17 vehicles or by natural erosion. This is understood by the municipality having jurisdiction 18 and some amount of regular maintenance is usually performed once the road stabilizes 19 for the season.

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21 We are concerned that a constant high heat source, buried relatively close to the surface 22 and combined with roadway materials of a lower quality than those used to construct 23 higher tier roads, will not allow a portion of the road to ever freeze. This in turn will 24 create a less stable travelway and will likely open the road surface to a longer period of 25 damage from passing vehicles or natural erosion. In addition, eroded material, when 26 transported away from the heat source, would then freeze where they land which may 27 cause additional hazards to passage. Addressing this erosion will also add to the amount 28 of annual maintenance that would be required for this type of road thereby creating 29 additional expenses for the municipality.

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1 It is noted that NHDOT is conducting tests with the FTB to determine their impact on 2 state owned roadways and that NHDOT is expected to announce their findings later in 3 2017. (See NHDOT Draft Conditions - Exception No. 1). Consideration should be given 4 to applying the NHDOT findings and subsequent construction requirements to all levels 5 of roadway, regardless of jurisdiction. 6 7 The impact of the waste heat on any utilities that either cross or run parallel to the 8 alignment of the proposed conduits has not been analyzed. 9 Q. Please describe the impacts of the underground construction with regards to differential settlement. 10 11 A. As noted previously, the NHDOT has set minimum burial depths for the proposed cables 12 under Tier 2, 3 and 4 roadways. Based on the indicated minimum burial depths in these 13 roads, differential settlement due to small movements the proposed cables is unlikely to 14 occur as the buried lines would be deep enough below the pavement to not reflect any 15 small movements in the line to the road surface. 16 17 Differential settlement is likely to be more of a concern in the Tier 5 and 6 roads where 18 the project is proposed to be located. Issues related to differential settlement may be 19 grouped into two categories: construction related and long-term. 20 21 Differential settlement related to construction typically occurs when the excavated trench 22 is backfilled after the utility is installed. If the backfill materials are not compacted 23 adequately, they will consolidate after placement and low spots will develop along the 24 length of the trench. The use of FTB will partially offset the potential for differential 25 settlement as that material, once it sets, is structurally stable enough to resist additional 26 settlement. In addition, should small voids form below or adjacent to the FTB, it will 27 constitute a large enough mass to not be affected. Any additional settlement would be 28 confined to material placed over the trench. 29

Long term differential settlement may occur in this application if the cables or splice pits are installed close to the road surface which, for this application, is considered to be below the frost line. In this case, the block of FTB or the concrete splice pit constitutes a large "hard spot" which will resist settlement. Then, over time, as the surrounding road material settles or compacts due to natural freeze/thaw cycles, bumps or uneven spots begin to appear. Management of this potential ongoing settlement will also require additional maintenance beyond what may be typically done on an annual basis.

Q. Please describe the impacts of the orders of conditions issued by the New Hampshire Department of Environmental Services.

A. The New Hampshire Department of Environmental Services ("DES") has issued its decision on portions of the application which relate to its regulatory authority. This decision was transmitted to the Site Evaluation Committee ("SEC") on March 1, 2017.
Among the multiple conditions placed on the Applicants, there are several which may be difficult to completely enforce or have the potential to lead to long term impacts.

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16 There are a total of 77 draft conditions issued by wetlands bureau in this document. Of 17 these, conditions 31, 37, 38, 39, 54, 55 and 70 may be difficult to thoroughly enforce or 18 may require action by the Applicants long after construction is complete. This is 19 especially true with the conditions related to invasive species. The species noted are, as 20 their name suggests, not native to the Project area. They tend to be able to germinate 21 quickly and often can prevent other native species from growing. Additionally, invasive 22 species may be difficult to eliminate once they have become established. It is important 23 that there be an independent monitor to be alert to the potential for the introduction of 24 invasive species and to verify the contractor is taking the appropriate measures to 25 discourage that introduction or to address their elimination should invasive species be 26 identified.

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28 Condition 5 of the DES conditions issued under the shoreland protection program 29 specifies that appropriate erosion and siltation controls be used based on several 30 conditions. This condition is rather non-specific. It is unclear whether this was done for the benefit of the agency to direct the contractor(s) as to what is appropriate or if they are
 allowing the contractor(s) flexibility in determining what is appropriate for a given
 situation.

4 Q. Please describe what the responsibilities of the monitor(s) might entail.

- 5 A. The Applicants have provided details of the responsibilities of the environmental 6 monitor(s) proposed for the Project. This information is provided in Appendix 4: NHDES Section 401 Water Quality Certification Application. In addition, Condition 36 7 8 of the DES draft conditions from the wetlands bureau describes additional duties to be 9 performed by the monitor(s). Of concern is the assertion that the Applicants will employ 10 the services of the monitor(s) for the Project. There are several important factors that 11 need to be considered in relation to this statement. These include the number of monitors 12 and their authority during final design and construction.
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The Applicants have indicated that there will likely be multiple construction crews working simultaneously in various places along the route to complete the work so it is possible that work in or around multiple resource areas will also occur simultaneously. It will be necessary, therefore, to have enough qualified monitors available to adequately observe the construction activity at each resource area on a regular basis.

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20 The authority of the monitors during the final design and construction phases is also 21 important. Each monitor should have the authority to work with the contractor to 22 develop the required resource area protection plans in accordance with all applicable 23 standards and to verify that they are approved by DES. In addition, the monitors must 24 also be required to consistently monitor construction activities at each resource area and 25 then have the authority, should plan violations occur, to take the necessary measures to 26 correct the violation up to and including stopping work at any given location until the 27 corrections are complete.

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29 Consideration should be given to requiring that the environmental monitors be 30 individuals that may act independently from the contractors and the Applicants, reporting

- only to the regulators. In addition, approval of those same monitors should be by the
 SEC or their approved representative(s).
- Q. Please describe the possible affect the orders of conditions issued by the DES and
 the NHDOT will have on the Project schedule.
- 5 A. Throughout the vetting process for this Project to date, a lot of the focus has been on the 6 lack of detail concerning the proposed design and supporting documents. Numerous 7 requests for more specific information and detail have been, and continue to be, made by 8 all parties. In addition, both of the draft order of conditions issued by the DES and the 9 NHDOT conditions require the Applicants to submit a variety of detailed plans for 10 approval prior to the start of construction.
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12 The DES conditions specify eight (8) different documents to be submitted. Most of these 13 come with the requirement that they be submitted "not less than 90 days before the start 14 of construction;" however, one required document does not have a due date but notes that 15 approval is required prior to the start of construction.

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Similarly, the NHDOT conditions specify a number of requirements that must be met.
Many of these concern the final construction plans but there are several that require
approval by NHDOT prior to construction. There are no minimum lead times indicated
for these documents to be submitted.

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22 Consideration should be given to providing additional lead time for review and approval 23 of these documents both by DES and NHDOT due to the anticipated volume of 24 information that will be required to be submitted to fulfill the conditions. It is quite 25 possible that the minimum requirement of 90 days will not be sufficient to provide the 26 detailed review of the documents that is required for a project of this magnitude. 27 Additionally, the final outcome, including potential short and long-term impacts will not 28 be visible to the SEC unless subsequent review by the SEC is required in addition to the 29 DES and NHDOT approvals.

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1 Another consideration is the overall Project schedule. Based on the SEC schedule, the 2 final determination on this project is due later this year. In contrast, the deadlines for the 3 above documents to be submitted will be well after that time. The SEC should consider 4 a level of continued involvement post-approval (should that occur) by an independent 5 monitor as may be determined to be necessary to verify that the various and wide ranging 6 Project conditions are fulfilled. In addition, changes to the extent of 7 wetland/environmental/rare, threatened or endangered species area impacts, along with 8 the locations of laydown and staging areas should be considered for review and approval 9 by the SEC.

- 10 **Q.** Does this conclude your testimony?
- 11 A. Yes.

Northern Pass Transmission Line SEC Docket No. 2015-06

EXHIBITS

A. Revised Dewberry Maps