BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Application of Transource Pennsylvania, LLC for approval of the Siting and Construction of the 230 kV Transmission Lines Associated with the Independence Energy Connection – East and West Projects in portions of Franklin and York Counties, Pennsylvania	:	Docket No. A-2017-2640195 Docket No. A-2017-2640200
Petition of Transource Pennsylvania, LLC for a finding that a building to shelter control equipment at the Rice Substation in Franklin County, Pennsylvania is reasonably necessary for the convenience or welfare of the public	:	Docket No. P-2018-3001878
Petition of Transource Pennsylvania, LLC for a finding that a building to shelter control equipment at the Furnace Run Substation in York County, Pennsylvania is reasonably necessary for the convenience or welfare of the public	:	Docket No. P-2018-3001883
Application of Transource Pennsylvania, LLC for approval to acquire a certain portion of the lands of various landowners in York and Franklin Counties, Pennsylvania for the siting and construction of the 230 kV Transmission Lines associated with the Independence Energy Connection – East and West Projects as necessary or proper for the service, accommodation, convenience or safety of the public	:	Docket No. A-2018-3001881, *et al.*

TRANSOURCE PENNSYLVANIA, LLC

REBUTTAL TESTIMONY

KEITH YAMATANI

STATEMENT NO. 12-R

Date: November 27, 2018

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JK

Q. Please state your name and business address.

A. My name is Keith Suekichi Yamatani. My business address is 1281 North Electric Road, Roanoke, VA 24019.

Q. By whom are you employed and in what capacity?

A. I am an Engineer Principal for American Electric Power Service Corporation ("AEPSC"). In this capacity I provide services to Transource Energy, LLC, the parent of Transource Pennsylvania, LLC ("Transource PA" or the "Company").

Q. What are your responsibilities in that position?

A. My primary responsibilities as an Engineer Principal are to provide leadership and engineering management for large or complex projects and for projects that have a prominent geotechnical engineering element to them such as the design and construction of transmission line facilities in karst terrain. I also serve as a subject matter expert in geotechnical engineering within AEPSC and provide consulting and training to my engineering colleagues related to geotechnical engineering and foundation design.

Q. Please summarize your background and experience.

A. I was born and raised in Montgomery County, Pennsylvania. I earned a Bachelor of Science (BS) degree in Civil and Environmental Engineering from the University of Pittsburgh in 1999 and a Master of Science (MS) degree in Civil Engineering (concentration in Geotechnical Engineering) in 2000 from the same university. I am a registered Professional Engineer in Pennsylvania (PE#: PE073290), Virginia (PE#:

0402046682), Rhode Island (PE#: PE0011094), Ohio (PE#: 77047), New York (PE#: 091374-1), Kentucky (PE#: 30878), Massachusetts (PE#: 50776), and West Virginia (PE#: 018291). While pursuing my BS and MS degrees, I gained three (3) years of construction management experience working for various construction firms in Pennsylvania where my responsibilities focused on earthwork, earth retention, and foundations. After earning my MS degree, I spent the next 17 years working as a geotechnical engineer, geotechnical engineering manager, office manager, and/or geotechnical / geologic / civil / structural engineering service line manager for various engineering firms working on projects that were primarily in the transmission line market sector. Over the course of that time, I worked on a number of projects in karst terrain and published two (2) papers that describe methods that can be considered to mitigate foundation reliability / cost / schedule risk for transmission line projects in karst terrain. In August 2017, I moved to Daleville, VA to work for AEPSC where I currently serve as an Engineer Principal for the Transmission Line Engineering group. In total, I have approximately 21 years of construction management, geotechnical engineering, and transmission line engineering experience.

Referenced papers:

1. Keith Yamatani, P.E. and Ashraf Jahangir, P.E., "Mitigating Risk and Managing Project Cost & Schedule on 'Mega' Transmission Line Projects: Beginning with the End in Mind", *GeoRisk 2011: Geotechnical Risk Assessment & Management*, June 2011.

2. Bledsoe, Yamatani, Glover, McMillen, Wilson, Williams, and Edwards, "500 kV Broadford-Sullivan Storm Restoration", *ASCE/SEI Electrical Transmission and Substation Structures Conference*, November 2012.

Q. Please describe the purpose of your Rebuttal Testimony.

A. The purpose of my Rebuttal Testimony is to summarize the Company's engineers' extensive experience in constructing transmission lines in karst, to explain that existing transmission lines exist in Franklin County, PA and other karstic regions, and describe the Company's approach to mitigate risk of karst and other geological features for the IEC Project which includes a study being conducted by a third party geotechnical engineering consulting firm, DiGioia Gray & Associates LLC, headquartered in Pittsburgh, Pennsylvania.

Q. Are you sponsoring any exhibits with your Rebuttal Testimony?

A. Yes I am sponsoring the following exhibits:

- TPA Exhibit No. KSY-1R – Map of AEP and Non-AEP transmission lines through karst areas in the northeast region of the United States.
- TPA Exhibit No. KSY- 2R – Great Appalachian Valley
- TPA Exhibit No. KSY-3R – AEP Experience in Carbonate Karst and Elbrook Formation in Southwest Virginia
- TPA Exhibit No. KSY-4R – STFC's response to TPA-STFC Set I, Question 9

Q. Stop Transource Franklin County ("STFC") Witness Dr. Sasowsky argues that karst landscape in Franklin County presents challenges to constructing the transmission line and that Transource PA does not have a suitable process in place to conduct safe construction (STFC St. No. 1, p. 7). Please describe the process Transource PA is taking to conduct safe construction of the transmission lines in areas where there may be karst.

A. In general, Transource PA's process may include:

1. Performing desktop and field studies to locate and inventory karst-type features and hydrological features (e.g. sinkholes, closed depressions, caves, and disappearing streams) within the proposed Right of Way (ROW)

2. Evaluating whether or not there are issues related to karst-type features and hydrological features that need to be considered in the design, construction, and operation of the transmission line

3. Avoiding karst-type features and hydrological features, where practical

4. If necessary, considering various mitigation options where it is not practical to avoid the karst and connected hydrological features

Q. Is Transource PA conducting a karst study?

A. Yes. AEP has hired Dr. Walter Kutschke, PhD, P.E., to perform a karst desktop and field study along the proposed IEC Project alignment. This study is in progress. Dr. Kutschke completed a Bachelor of Science from State University of New York at Buffalo in 1993 with a major in civil engineering, a Master of Science in civil engineering specializing in geotechnical engineering at State University of New York at Buffalo in 1995, and a

Doctor of Philosophy in civil engineering specializing in geotechnical engineering at the University of Pittsburgh in 2011. He is a registered Professional Engineer in Maryland (23430), Minnesota (51181), North Carolina (41752), Pennsylvania (PE054667E), Tennessee (118811), and West Virginia (14110). Dr. Kutschke is the Service Line Manager for the Geotechnical Engineering & Geosciences group of DiGioia Gray & Associates LLC. In this position, he is responsible for the technical, quality, safety and financial performance of the group. He has been employed with DiGioia Gray for one year. Prior to joining DiGioia Gray, he was a senior geotechnical engineer and geotechnical department manager with AECOM Technical Services, Inc. (AECOM) where he was employed (by AECOM and its predecessors) for 23 years. His professional responsibilities at AECOM consisted of managing, mentoring and providing technical input and senior oversight related to geotechnical and karst engineering aspects of projects. His karst project experience extends along the eastern United States from Minnesota to Florida. Dr. Kutschke is well versed with karst as demonstrated by his relevant project experience and published works, some of which are summarized as follows:

- Gallatin Fossil Plant, Tennessee Valley Authority, Gallatin, TN. Karst expert witness for federal litigation (M.D. TN No. 3:15-cv-00424) as well as state litigation (Davidson County Chancery No. 15-23-IV) involving Coal Combustion Residual storage in an existing 500± acre Ash Pond Complex situated over karst. Dr. Kutschke provided deposition testimony and direct testimony during February 2017 for M.D. TN No. 3:15-cv-00424.

- Interstate 69, Evansville to Indianapolis, Section 4, US 231 to SR 37, Indiana Department of Transportation, Greene and Monroe Counties, IN. Principal karst engineer serving on the Karst Design Committee responsible for the development of karst mitigation features for 23 miles of new interstate highway with a construction cost of $440M.
- *Interstate 70, Maryland State Highway Administration, Frederick County, MD. Karst* engineer for the reconstruction of two miles of I-70 with associated new interchanges between MD 355 and MD 144 with a construction cost of $59M. Project had an aggressive sinkhole occurrence rate of approximately 8 sinkholes per year prior to Dr. Kutschke's work.
- Knoxville Terminal, BP Products of North America, Knoxville, TN. Principal karst engineer responsible for the site characterization and geotechnical recommendations for an existing above ground fuel tank farm with eight storage tanks (60-ft to 120-ft diameters) that was historically plagued with sinkhole development.

Q. How will Transource PA use the karst study to conduct safe construction?

A. The karst study will enable Transource PA to better understand locations where active karst-type features and hydrological features exist along the IEC Project ROW. Once the study is complete, Dr. Kutschke can assist Transource PA in developing a strategy to understand risks related to the active karst-type features and the other concerns raised by STFC witnesses Dague and Sasowsky, and how to mitigate them. This strategy may include the following:

1. Considering a supplemental targeted subsurface investigation to collect additional information.
2. Evaluating the need for karst risk mitigation related to various aspects of design, construction, and operation of the transmission line.
3. Identifying locations for potential structure or access road relocations to avoid active karst-type features.
4. If necessary, developing site-specific karst mitigation strategies

Q. What will Transource PA do if it encounters karst in the transmission line route?

A. If Transource PA's studies reveal karst features in the transmission line route, additional evaluations may be necessary to determine whether those karst features will be impacted by the transmission line and whether additional investigation and/or mitigation should be considered. Prior to conducting additional investigation or developing mitigation, Transource PA will consider shifting structures or other facilities into areas where karst mitigation can be avoided.

Q. Do you have experience in constructing transmission lines in areas where there is karst?

A. Yes. Transource PA's majority owner, American Electric Power (AEP), has a long history of successfully and safely designing, constructing, and operating transmission lines across various types of karst terrain (carbonate and gypsum) in multiple states, including Texas, Oklahoma, Arkansas, Tennessee, Kentucky, Indiana, Ohio, West Virginia, and Virginia. TPA Exhibit No. KSY-1R is a map of karst terrain with an

overlay of AEP's transmission lines in the northeast region of the United States. As shown in this exhibit, AEP has a vast amount of experience designing, constructing, and operating transmission lines in karst terrain, a number of which traverse through the Great Appalachian Valley (see TPA Exhibit No. KSY- 2R) which encompasses Franklin County, PA. In Virginia alone, AEP operates over 70 transmission lines that traverse through the Great Appalachian Valley. The average age of these VA transmission lines passing through the Great Appalachian Valley is over 50 years with some as old as 93 years. Those transmission lines are depicted on TPA Exhibit No. KSY-1R. In addition to these transmission lines, AEP has in service thousands of miles of distribution lines that traverse karst terrain.

Even more specifically, the karstic geologic formation (Elbrook Formation) that underlies the majority of the proposed IEC Project in Franklin County, PA, is even more prevalent in the southern portions of the Great Appalachian Valley, in the heart of AEP's transmission line network in southwest Virginia (See TPA Exhibit No. KSY-3R). AEP's process includes detailed study of the underlying karst in sensitive areas and appropriate precautions to develop stable transmission line structures and foundations. TPA Exhibit No. KSY-1R also depicts several non-AEP transmission lines that traverse through karst areas of Franklin County, PA. Transource PA is leveraging AEPSC's vast experience in karst terrain to execute a safe process for the design, construction, and operation of the IEC Project transmission line.

Q. Is Transource PA able to safely construct the transmission lines even if there is karst present in the area?

A. Yes. This is evidenced by AEP's track record of designing, constructing, and operating transmission lines throughout karst areas across the United States. Transource PA will leverage this vast experience as well as AEPSC's internal and external subject matter experts in karst to develop and implement safe designs.

Q. Dr. Sasowsky also argues that the construction of the transmission lines may impact groundwater, surface water, and wells (*see, e.g.*, STFC St. No. 1, pp. 10, 13-14). What steps will Transource PA take to minimize impacts to groundwater, surface water and wells?

A. The first step in mitigating impacts to groundwater, surface water and wells is to complete the ongoing karst study to better understand where karst features and hydrologic features exist and whether the transmission line may be impactful to them. If the ongoing karst study finds karst-type features and hydrologic features that pose a risk for impacting groundwater, surface water or wells, there are several strategies to consider. If necessary under the circumstances, some of these strategies may include (but would not necessarily be limited to):

1. Shifting/relocating transmission line facilities: It may be possible to relocate some transmission line structures and/or the access roads and construction pads used to construct them such that the risk of impacting a karst-type feature or hydrologic feature is mitigated. The viability of shifting/relocating transmission line facilities will depend on a number of factors including, but not necessarily limited to, structural impacts to adjacent structures, ROW/easement agreements, cultural impacts, and potential environmental impacts beyond those associated with karst.

2. Implementing erosion and sediment control devices in accordance with Pennsylvania Stormwater Best Management Practices Manual, December 30, 2006 (PABMP): Implementing erosion and sediment control devices and practices that are in general accordance with PABMP should mitigate concerns related to the transport of sediment to karst features that are beyond the limit of disturbance of the IEC Project construction.

3. Reclamation of disturbed areas back to original grade: It may be possible to regrade areas within the limit of disturbance to their pre-development contour. This would mitigate concerns related to long-term changes in surface water flows.

4. Using of stormwater convenance facilities (e.g. pipes, culverts, water bars, and ditches) to generally maintain the pre-development drainage pathways: In locations where hydrologic features are crossed by construction roads or pads, stormwater conveyance facilities may be used to mitigate changes to surface water flow paths.

5. Establishing buffers around karst-type features: If karst-type features are located within the project limits and structure/road relocation is not viable, it may be possible to establish buffers around these features to help isolate them from areas of construction and future maintenance.

6. Developing site-specific mitigation strategies: If relocations and/or buffers are not viable, site-specific mitigation strategies may also be considered. Some site-specific mitigation strategies may include, but are not limited to, additional erosion/sediment control within the limit of disturbance around karst-type features, placement of gravel/rock filters around or within sinkhole throats, storage of potential

contaminants, and development and implementation of a hazardous spill contingency plan.

7. Evaluating options for foundation installation means and methods that reduce the potential for impact to groundwater, surface waters, and wells: There are various options for foundation construction to help mitigate impacts to karst-type features. Some of these options may include, but are not necessarily limited to, use of casing to help reduce migration of foundation concrete into subsurface air-filled voids, considering alternate foundation types, and staged concreting.

Q. STFC Witness Dague also states that "[e]rection of utility towers in the ground on the fault zone is a problem" (STFC St. No. 1, p. 10 and 13-14). Given the study and mitigation (where necessary) approach described in your testimony, do you agree?

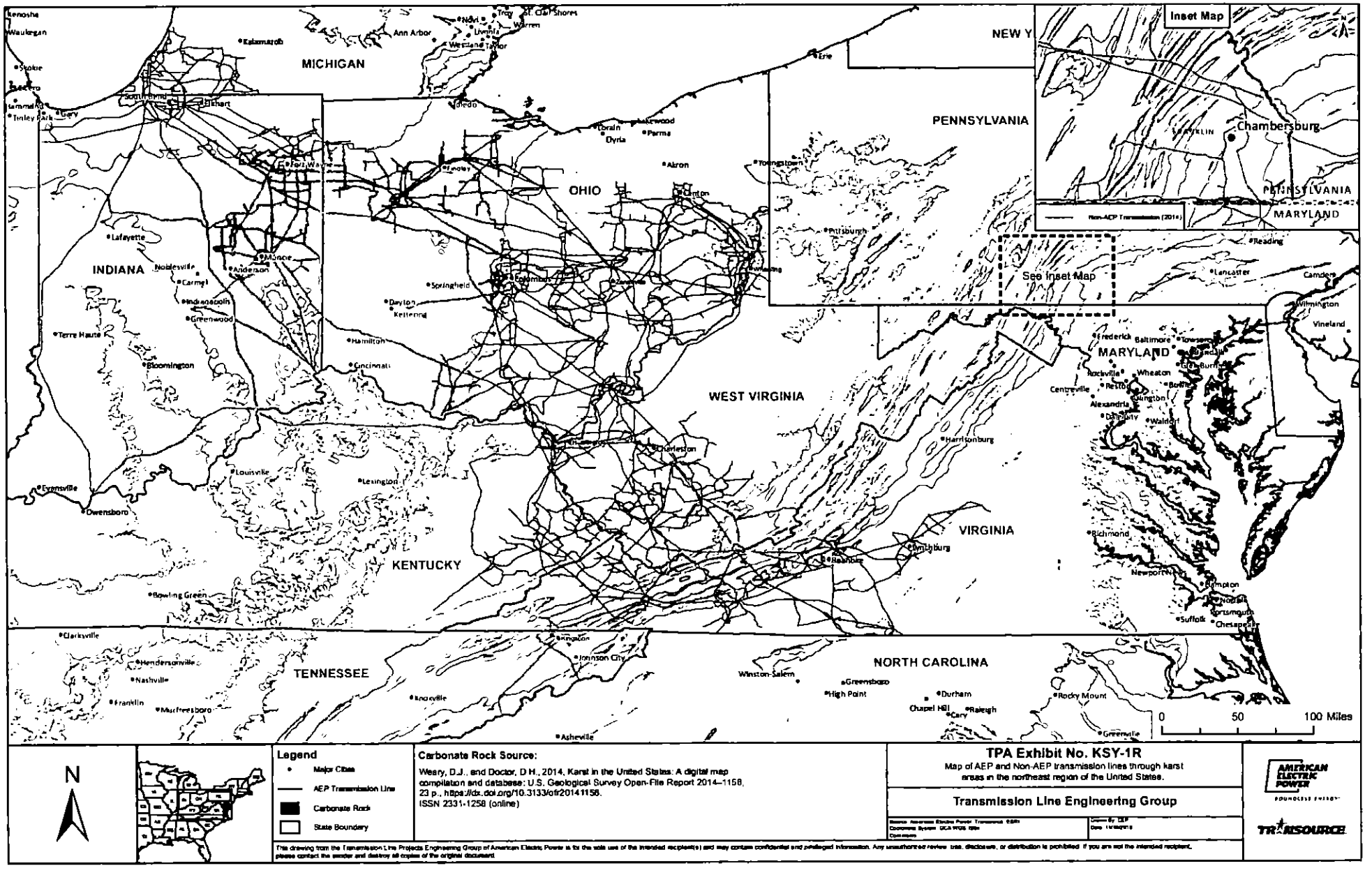
A. No. Geological risks like those described by Mr. Dague (and Dr. Sasowski) are addressed by the methods I have described in my testimony. Transource PA has extensive technical and managerial expertise and experience in constructing transmission lines in challenging terrain, and it will leverage this expertise and experience in constructing the Project.

Q. Is the experience you described in this testimony related to numerous transmission projects constructed in areas where there is karst consistent with Dr. Sasowsky's admission in STFC's Response to Transource PA's Interrogatory and Document Request Set I, No. 9 that there have been many structures built on areas generally identified as karst?

A. Yes. (*See* TPA Exhibit No. KSY-4R, which is STFC's response to TPA-STFC Set I, Question 9.)

Q. Does this conclude your Rebuttal testimony at this time?

A. Yes.



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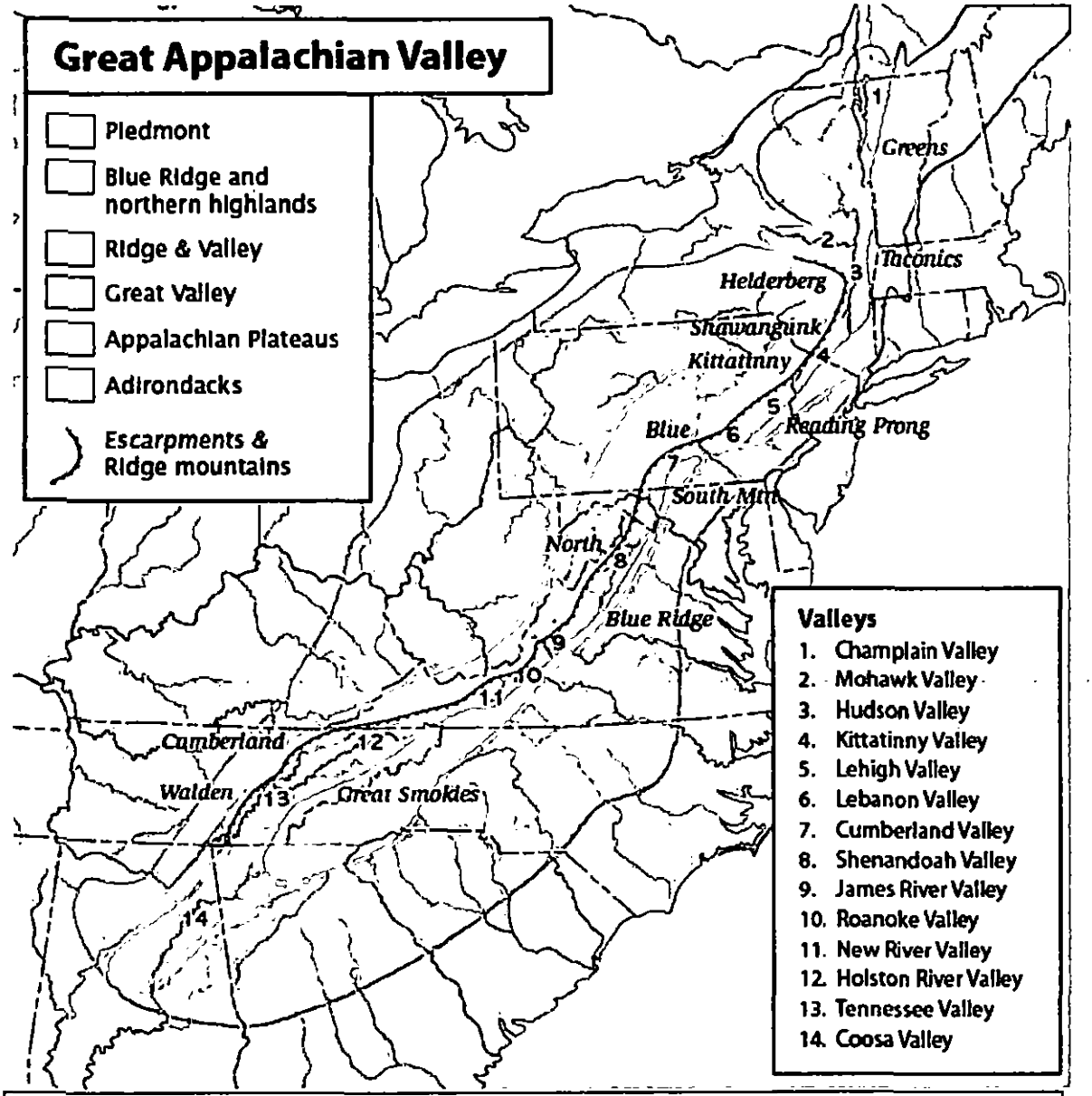
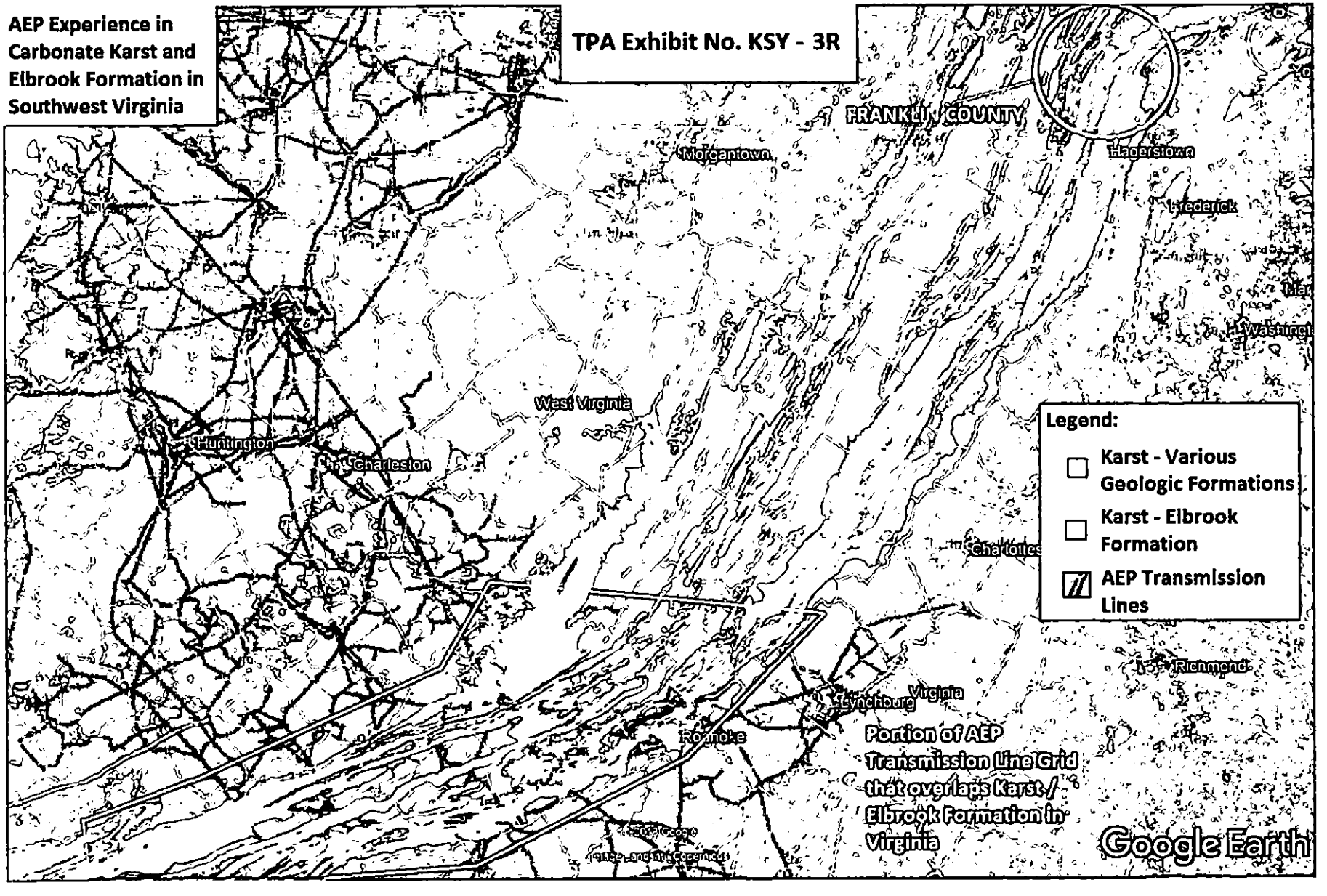
TPA Exhibit No. KSY - 2R: Great Appalachian Valley



By Greatvalley-map.jpg: Pflyderivative work: Perhelion (talk) - Greatvalley-map.jpg, CC BY-SA 2.5, https://commons.wikimedia.org/w/index.php?curid=10309620

AEP Experience in Carbonate Karst and Elbrook Formation in Southwest Virginia

TPA Exhibit No. KSY - 3R



Application of Transource Pennsylvania, LLC	:	
Filed Pursuant to 52 Pa. Code Chapter 57,	:	Docket No. A-2017-2640195
Subchapter G, for Approval of the Siting and	:	Docket No. A-2017-2640200
Construction of the 230 kV Transmission Line	:	
Associated with the Independence Energy	:	
Connection-East and West Projects in Portions of	:	
York and Franklin Counties, Pennsylvania	:	

RESPONSES OF STOP TRANSOURCE FRANKLIN COUNTY TO CERTAIN INTERROGATORIES AND DOCUMENT REQUESTS OF TRANSOURCE PENNSYLVANIA, LLC– SET I

9. Re: Page 6, lines 1 and page 9, lines 3-4, please provide the number of each of the following listed "property concerns" located in the state of Pennsylvania which have been constructed in areas shown as carbonate bedrock in Figure E in the following categories. If the exact number is not known, please provide an estimate of each based upon Dr. Sasowsky's professional judgment and experience.

   a) Residences

   b) Businesses

   c) Roads

   d) Rail lines

   e) Pipelines (water)

   f) Pipelines (gas)

   g) Pipelines (other than water or natural gas)

   h) Telephone lines, including telecommunication or fiber optic lines

   i) Electric lines

RESPONSE: Subject to STFC's October 23, 2018, Objections, the specific number of "property concerns" is not known to Dr. Sasowsky from publications or his personal experience. To answer the question fully for each of the listed categories would require an extensive Geographic Information System (GIS) analysis, which has not been undertaken. The most accurate answer available, to his knowledge, for all categories in composite, is probably "many".

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TRANSOURCE PENNSYLVANIA, LLC

REJOINDER TESTIMONY OF

KEITH S. YAMATANI

STATEMENT NO. 12-RJ 2/26/19 HBJ FF

Date: February 11, 2019

Q. Please state your name and business address.

A. My name is Keith S. Yamatani. My business address is 1281 N Electric Rd., Roanoke, VA 24019.

Q. By whom are you employed and in what capacity?

A. I work for American Electric Power Service Corporation as a Planning & Engineering Supervisor for the Transmission Line Engineering department.

Q. Have you previously provided testimony in this proceeding?

A. Yes.

Q. Do you make any corrections to your rebuttal testimony?

A. Yes. At the time of my rebuttal testimony, my title was Engineer Principal for the Transmission Line Engineering department. On December 29, 2018, I was promoted to Planning & Engineering Supervisor for the Transmission Line Engineering department. In my new role, I am responsible for leading a team of engineers and designers to support various projects, including those that have a prominent geotechnical engineering element to them such as the design and construction of transmission line facilities in karst terrain. My recognition and efforts as a subject matter expert in geotechnical engineering within AEPSC remain the same.

Q. Are you sponsoring any exhibits with your rejoinder testimony?

A. No.

Q. What is the purpose of your rejoinder testimony?

A. The purpose of my rejoinder testimony is to respond to the surrebuttal testimony provided by Dr. Ira D Sasowsky.

Q. Have you reviewed the surrebuttal testimony of Dr. Ira D. Sasowsky?

A. Yes.

Q. In his surrebuttal testimony, Dr. Sasowsky expresses concern that Transource PA is treating karst as a collection of individual sites to be treated as a special case instead of looking at the karst hydrological system as a whole. He goes on to state concerns with the "absence of an integrated, holistic approach (plan)" and further states that he would expect Transource PA to have gathered more detailed information regarding the karst hydrological system prior to planning any project across a large karst area (p. 3). Are Dr. Sasowsky's concerns and expectations warranted?

A. No. It is incorrect to assume that Transource PA does not have an appropriate plan to understand and address karst risks. On the contrary, Transource has a comprehensive plan to address karst on both a broad and localized basis, as further described below. Transource PA has a proven process of characterizing karst which is evidenced by our track record of safely building transmission lines in karst terrain, as described in my rebuttal testimony.

Q. How does Transource PA address karst on both a broad and localized basis?

A. Transource PA took a broad approach to characterizing karst during the siting process. During siting, Transource PA determined the entire area encompassed by the alternative routes for the western transmission line is underlain by karst terrain as depicted by Figure 7 in the respective siting study. Sinkholes and surface depressions were also depicted on Figure 7. However, the entire area described as limestone was considered equally "karstic". In Transource's experience, karst is a manageable subsurface condition with the execution of an appropriate subsurface investigation and implementation of proper mitigation techniques, which we will do on this Project.

Specifically during design, Transource PA's strategy for the IEC project is to take both a broad and local approach to karst investigation and mitigation. The broad aspects of the investigation include:

- Collecting topographical survey data along the entire project alignment to understand the direction of pre-development surface water flow;
- Collecting subsurface information throughout the entire project area, consisting of borings, probes, and geophysical testing; and
- Conducting a karst study over the entire project area which consists of the following:
    - Desktop research – A review of geologic maps, PA karst databases, and existing subsurface information and other relevant project data such as preliminary structure and access road locations.
    - Field reconnaissance – Using a GPS unit, Dr. Walter Kutschke will oversee a team of geologists that will perform a reconnaissance of the entire project area and confirm or dispute the existence of karst features from PA databases and document karst features that do not exist on PA databases.

- Karst inventory – Dr. Kutschke's team will develop an inventory of all the observed karst type features observed during the site reconnaissance and characterize them.

The broad aspects of the mitigation include:

- Using pipes/culverts/ditches to allow post-development surface water to continue to flow along pre-development flow paths;
- Ensuring the design incorporates aspects which comply with state and federal regulations related to storm water and erosion and sediment control; and
- Providing environmental training to our contractors.

Q. Please describe how Transource PA approaches karst on a localized basis.

Due to the nature of karst (subsurface conditions can change over short horizontal distances) and the unique characteristics of an above-ground transmission line project, as stated above, it is necessary to supplement our broad-based karst mitigation approach with a more local approach at the discrete locations of our proposed infrastructure. Parts of our localized mitigation strategy will include:

- Evaluating the potential impact the karst type features from Dr. Kutschke's karst inventory and developing site-specific mitigation strategies, if necessary. These, may include structure relocations, access road re-alignments, establishment of buffers around karst features, implementation of extra erosion and sediment control at karst features, and use of gravel/rock filters around or within karst features.
- Developing a collection of foundation designs in advance of construction and then finalizing the selection of the appropriate foundation size based on as-drilled

conditions, determined by an onsite geo-professional, at each transmission line structure foundation. By doing this, each foundation is tailor-fit to the actual subsurface conditions at the foundation location. This has huge benefits to the project by ensuring a high level of design reliability while at the same time being cost effective.

Q. Are there unique aspects of above-ground electric transmission lines that drive the process of supplementing a broad-based karst mitigation strategy with a more local one?

A. The two main characteristics of above-ground transmission line projects that drive a more localized approach is the fact that transmission line structures have a small footprint (about 10-feet in diameter), are widely spaced (average spacing is over 2 and a half football fields), and are flexible in terms of their placement, even after the project alignment has been established.

Above-ground electric transmission line projects are dramatically different than say, an underground pipeline project where you have a long, permanent, and continuous disruption of the subsurface along the entirety of the project. In fact if you compare the footprint of the western IEC transmission line foundation excavations to that of a pipeline, the transmission line footprint is ~1/3 acre which is only 1 to 2% of the ground disturbance of a pipeline of the same length. This allows implementation of the effective mitigation strategies that I described previously, which may not apply to types of projects such as pipeline projects.

Q. **On page 4 of his surrebuttal testimony, Dr. Sasowsky describes Transource PA's approach as more reactive than proactive. Do you agree?**

A. No. I believe the opposite to be true. We are being proactive by performing the following activities prior to final design:

- Conducting a subsurface investigation that consists of borings, probes, and geophysical testing;
- Performing a karst study which includes a desktop study, field reconnaissance and karst inventory;
- Developing a suite of foundation designs at each structure location to enable the final selection of the foundation design to be based on as-drilled subsurface conditions at each transmission line structure foundation location;
- Reviewing the locations of proposed infrastructure compared to the results of the karst study and shifting the locations/alignments of that infrastructure if possible and necessary to mitigate the risk of impacting karst;
- Deploying broad mitigation strategies across the project, regardless of the nature of karst, that mitigate risks associated with karst by allowing water to flow along pre-development paths and to prevent construction sediment from entering karst features; and
- Developing site-specific karst mitigation measures, if required, based on the results of the karst study.

Q. In his surrebuttal testimony, Dr. Sasowsky expresses concern that Transource PA does not have specific protocols that would guide actions during the investigation or construction phases (pp. 4-5). Does Transource PA have any such protocols?

A. Transource PA will follow AEP's design requirements for this Project, which has volumes of engineering and design standards that guide actions during the design phase of the Project. One of the transmission line design requirements, titled *AEP TLDS-601: Transmission Line Structure Foundation Design Manual*, dedicates an entire chapter to the process of designing and implementing a subsurface investigation. The process includes, but is not limited to, performing a geologic desktop study, performing a field reconnaissance, locating borings in consideration of the structure types and anticipated geology and subsurface conditions along the project alignment, performing field and laboratory testing, and classifying the collected data. Other chapters cover topics such as foundation design for monopole structures.

AEP's design requirements also has volumes of construction specifications that will guide actions during the construction phase of the project. These specifications will supplement other construction documents such as drawings which will include notes that outline specific requirements how to address subsurface conditions which are not specifically covered in the construction specifications.

Q. In his surrebuttal testimony, Dr. Sasowsky expresses concern that Transource PA has a lack of commitment to the mitigation strategies that will be used on the IEC project (p. 5). Is there a reason that Transource PA hasn't yet committed to the mitigation strategies they will deploy on the IEC project?

A. Transource PA commits to complying with all applicable local, state, and federal regulations. These regulations require Transource PA to implement erosion and sediment control, and to limit post-development runoff quantities to that of the pre-development condition. Managing water quality and quantity in this manner will be part of the karst mitigation strategy. Transource PA commits to using stormwater conveyance facilities (culverts, pipes, ditches, etc.) to allow surface water to generally flow to areas that it is currently flowing. While Transource PA plans to implement local mitigation it would not be appropriate to identify location-specific karst mitigation strategies at this time because the karst study and final design is ongoing.

Q. Dr. Sasowky opines that Transource PA is only giving scant attention to water in the safe conduct of the project (p. 6). Do you agree?

A. No. Transource is giving robust attention to water as it relates to the safe conduct of the Project. Transource understands that changes to water flow quantities can influence the development of sinkholes. This is one of the main reasons that Transource is studying surface water flow paths and endeavoring to use stormwater conveyance facilities to allow water to flow to its pre-development destination. Transource also understands the importance of water quality. Current applicable local, state, and federal regulations have stringent requirements pertaining to water quality and quantity. There are numerous mitigation strategies and best management practices that will be deployed by Transource on the IEC Project through our normal course of business, in both karst and non-karst areas.

Q. Does this conclude your rejoinder testimony at this time?

A. Yes.