DUKE ENERGY OHIO EXHIBIT ___

BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Duke Energy Ohio, Inc., for a Certificate of Environmental Compatibility and Public Need for the C314V Central Corridor Pipeline Extension Project.	)))))	Case No. 16-253-GA-BTX

DIRECT TESTIMONY OF

JAMES NICHOLAS

ON BEHALF OF

DUKE ENERGY OHIO, INC.

March 26, 2019

TABLE OF CONTENTS

PAGE

I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is James Nicholas, and my business address is 312 Elm St #2500, Cincinnati, OH 45202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by The Louis Berger Group, Inc. (recently acquired by WSP Global, Inc.), as Director of Transmission Siting.

Q. PLEASE BRIEFLY SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I received a B.S. in Physical Geography from Queen Mary College, University of London, in 1990, an M.A. in Geography from the University of Cincinnati in 1993, and a Ph.D. in Geography with a minor in Geology from the University of Cincinnati in 2005.

I began my career as an Assistant Geographer with Dames & Moore, which was later merged into URS Corp. I progressed at URS through Senior Scientist, Project Manager, and Principal Scientist, by 2007. I worked for CH2M from 2010 through 2016, then Burns & McDonnell for 18 months before joining Louis Berger in 2018. In March 2019 Louis Berger was acquired by WSP

Q. PLEASE SUMMARIZE YOUR RESPONSIBILITIES AS SITING DIRECTOR.

A. I conduct industry research, take part is marketing and business development efforts, prepare proposals, provide senior level review and direct siting and

permitting projects for pipeline, electric transmission line, and power plant projects throughout the country, but mostly within the Ohio, Kentucky, and Indiana region.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE OHIO POWER SITING BOARD?

A. Yes. I provided siting testimony for a Columbia Gas pipeline project and a FirstEnergy electric transmission project.

Q. WHAT IS THE NATURE OF YOUR INVOLVEMENT WITH THIS PROCEEDING?

A. Duke Energy Ohio, Inc., (Duke Energy Ohio or Company) is seeking approval from the Ohio Power Siting Board (Board) for a certificate for the construction, operation, and maintenance of a new, 20-inch natural gas distribution pipeline (proposed pipeline). At the time the route selection study (RSS) was conducted, I was employed by CH2M and we were retained by Duke Energy Ohio to assist with an RSS for the project. My role was as lead siting consultant in charge of a team that assembled the mapping and siting data and assisted the Company with development of a practical siting methodology, and selection and evaluation of route alternatives. CH2M also prepared the Application document with input from and review by Duke Energy Ohio personnel.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to explain the approach and conclusions of the RSS performed for purposes of the proposed pipeline and to address related parts of the Application.

II. ROUTE SELECTION STUDY

Q. WHAT IS A ROUTE SELECTION STUDY?

A. An RSS is a process that attempts to find practical route corridors that achieve the technical aims of the project, as specified to us by our client, while avoiding and/or minimizing effects on the existing built and natural environment to the extent practical, and then to compare those potential route corridors using relevant information to come up with a short list of suitable routes. It is an iterative process where there can be constant adjustments, particularly in a well-developed area such as was the case in this project. The RSS continued until the first open house, when potential routes are presented to the public. As the siting process proceeds, adjustments to the route may occur based upon public comments, engineering-driven adjustments or other input as needed. An RSS takes into account identifiable facts such as existing land uses, terrain, and existing utility infrastructure, and includes stakeholder input, and qualitative and quantitative considerations. Board Staff reviews and evaluates the selection process and conclusions as part of the Application review.

Q. WAS THE RSS IN THIS PROCEEDING PREPARED BY YOU?

A. The RSS was prepared under my direction and I reviewed it in detail. I am sponsoring the RSS, as incorporated in the Application as Appendix 4-1.

Q. WHAT ARE THE BACKGROUND CONCEPTS FOR PREPARING AN RSS?

A. The overall purpose of an RSS, working within the physical and technical constraints of the project, is first to find practical, viable, routing options for the

project and then to compare them to one another to identify the most favorable routes. If a route does not connect the two required points or is, for some physical reason, not able to be constructed, then it is rejected or adjusted.

Duke Energy Ohio presented us with the basic project requirements (connection points, technical restrictions, ROW requirements, and so on), and we collected relevant data and mapped it to help first identify possible routes, and then to compare these routes to one another. For a project under the jurisdiction of the Board, the most favorable routes would include meeting the requirements of Ohio Revised Code (R.C.) 4906.10(A)(3), which provides that the Board must find and determine that "the facility represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, and other pertinent considerations . . .." Therefore, the study process is designed to identify and compare routes that minimize the overall combined effects on ecology, land use, and cultural resources, while maintaining technical and economic viability and complying with the regulatory requirements for the project. If route options are not viable, they cannot be considered. Once viable routes are found, then they are compared using a common suite of criteria. It is also worth noting that, as the routes are evaluated in increasing detail, adjustments have to be made as additional restrictions/engineering limitations are revealed. These might include existing buried utilities, restrictive easements, environmental concerns, and space restrictions, to name a few.

To assist with route comparisons and focus on the better options (we begin with a large number of possible routes made up of multiple segments), we conduct

a numeric RSS that uses a series of quantifiable criteria to directly compare the routes. The criteria are divided into four categories: land use, ecological, cultural, and engineering. The first three groups of criteria are used primarily because these are the subject areas that the Board requires an applicant to assess in the Application. The fourth category, engineering, is used because there is a point at which a route option may become too difficult, complicated, or impracticable to construct, and cost is a factor that Duke Energy Ohio has to consider as a public utility.

Q. WHAT WERE THE MAJOR STEPS IN PERFORMING THE RSS FOR DUKE ENERGY OHIO'S PROPOSED PIPELINE?

A. The first step was to delineate a focused study area. The second step was to collect and map both constraints and opportunities, with the goal of placing potential routes that minimized constraints and made maximum use of opportunities. Finally, after the routes have been refined through site visits, they are scored and ranked. The scoring and ranking is used as a guide to help the siting team select recommended routes to carry forward as preferred and alternate routes in the Application. The scoring, or numeric part of the study, is used to help separate the routes into those that affect fewer constraints and to focus efforts on those. The scoring helps identify the better set of routes. A constructability and qualitative review is then undertaken by the siting team, with input from the public meetings. Once the preferred and alternate routes are selected, they are presented in the Application, and a process of small adjustments is typical, based on land owner input and detailed engineering. All adjustments are identified to the Board.

Q. PLEASE DESCRIBE THE STUDY AREA USED FOR THIS PROJECT.

A. The main study area included approximately 90 square miles, roughly defined by Interstate 275 on the north, the Mill Creek Valley on the west, the Duck Creek Valley to the south, and the Little Miami River to the east. In addition to this area, the RSS also considered opportunities through the Madeira and Indian Hill areas. The goal, as identified by the Company, was to identify routes that began, at the northern end, at the existing terminus of the existing C-314 pipeline, in an industrial area about one mile north of Interstate 275. The routes were to end along the existing Line V, anywhere between the intersection of Varelman Avenue and Cartage Avenue, at the western end, and the intersection of Interstate 71 and Ridge Avenue at the eastern end. To respond to comments received from the public, the study area was extended further to the east to review options east of I-71.

Q. HOW WAS THIS STUDY AREA DEVELOPED?

A. The study area was developed by Duke Energy Ohio, based on its system needs, and a set of physical limitations in the area.

Q. PLEASE DESCRIBE WHAT YOU MEAN BY CONSTRAINTS AND OPPORTUNITIES.

A. For the purpose of the RSS, constraints are areas that would limit the development of large natural gas pipelines. Opportunities, on the other hand, are features that are more compatible with such development. Collectively, constraints and opportunities are types of criteria. The aim is to minimize constraints and maximize opportunities, recognizing there is no way to avoid all constraints.

Q. WHAT ARE SOME EXAMPLES OF CONSTRAINTS AND OPPORTUNITIES THAT PLAYED A ROLE IN THE RSS FOR THE PROPOSED PIPELINE?

A. The project area was densely developed with a mix of residential, commercial and industrial land uses with associated rail, electric, sewer, water and cable developments along most of the streets. This imposed an array of physical limitations that significantly reduced practical routing opportunities. We described this as a "constrained" siting study because of these physical limitations. These constraints were identified on pages 2-2 and 2-3 of the Application. In addition to the physical structures and infrastructure limitations, the constraints included woodlots, wetlands, wildlife, historic places, cemeteries, residences, institutional uses, sensitive land uses, road crossings, railroads, length of the route, slope, and the number of parcels crossed. Opportunities were limited, but included open spaces provided by front yards, back yards, parking lots, streets, and areas parallel to railroads and highways. These are also identified in the Application. In this urban setting, the primary routing opportunities were considered to be an existing railroad, Interstate 71, Interstate 75, and existing secondary streets.

Q. HOW DID YOU EVALUATE THE CONSTRAINTS AND OPPORTUNITIES FOR PURPOSES OF IDENTIFYING POTENTIAL ROUTES?

A. The evaluation criteria in an RSS have to be relevant to the issue and, in the numeric part of the study, they have to be quantifiable and mappable. The relevance of the criteria, or constraints and opportunities, is determined in several ways. Of primary

importance is the nature of the project. For a natural gas pipeline, important criteria include such factors as proximity to residences, existing structures, existing infrastructure, slopes, woodlands, and wetlands. The second determinant of relevance is the regulatory framework. For the Board to approve an application, it must be confident that the applicant has evaluated the impacts of the project on ecological, cultural, and socioeconomic criteria. It must also be confident that construction of the project is technically possible. Furthermore, the Ohio Environmental Protection Agency and the U.S. Army Corps of Engineers regulate wetlands and projects impacting wetlands require a permit from these agencies. Part of the permitting process involves a demonstration that the applicant has made efforts to avoid, and then minimize the impact of the project on waters and wetlands. Similarly, known cultural resources are overseen by the Ohio Historic Preservation Office, and their review is triggered by the Board process.

In this study, the first hurdle was to identify areas where it was physically even possible to locate the pipeline, then assess additional preference criteria. It is typical to use limitations to eliminate areas first; that is, identify areas where placing a pipeline is not possible. Those limitations are described in the RSS.

Q. HOW ARE SITING CRITERIA CHOSEN FOR USE IN THE RSS?

A. Decisions must be made as to which individual criteria with the subject area are relevant and quantifiable. For example, in the ecological group of constraints, we needed to assess impacts to those things that are regulated or of concern to the Board. These include wetlands, streams, endangered species, and woodlands. In this example, the best available quantifiable reference data on wetlands is from the

National Wetland Inventory (NWI). The best available existing threatened and endangered species data comes from the Ohio Department of Natural Resources Division of Wildlife and from the U.S. Fish and Wildlife Service. Woodland data is digitized from the most recent geo-referenced aerial photography. The same test of relevance and quantification applies to the socioeconomic and cultural constraints. A table of criteria, along with a notation regarding their relevance, is included in the Application.

Q. ONCE YOU HAVE DETERMINED THE SCREENING ATTRIBUTES, WHAT IS YOUR NEXT STEP?

A. Detailed mapping of the study area is created utilizing Geographic Information System (GIS) software to show the location and extent of the individual constraints, along with digital aerial photographs. These maps are then used to identify potential practical, viable routing options for the project. The next step is to review each identified routing option and count occurrences of the constraints in relationship to each potential route. The results are collected for each constraint within the group. For example, the linear feet of wetlands crossed by the various routes might vary dramatically, but that factor in isolation provides no sense of whether it is of relatively high impact or low impact. Therefore, we normalize the data to a "score" out of 100, relative to all other routes under consideration.

Assigning a score involves including all the data for that criterion among all the route candidates, and this becomes the data range. Thus, if the linear feet of wetlands crossed by the routes under consideration ranged from 100 feet to 10,000 feet, that would be the range being analyzed. Normalization adjusts the data to fit

into the range 0 to 100. The criterion with the lowest impact of all the routes for that criterion is assigned 0, the highest (*i.e.*, worst) is assigned 100. The same is true for all the other individual criteria. This way the routes are directly compared to each other. This allows simplified comparison without inadvertent weighting. The magnitude of differences between the routes is preserved and it has the advantage of meaning in isolation. For example, if a particular route crosses 20 feet of wetland, there is no easy way of concluding if that is relatively "good" or "bad" compared to the other routes. If, however, the wetland score was 80 out of a possible 100, we would know that it is relatively high impact compared to the other routes.

Q. WHY ARE FACTORS OTHER THAN TYPICAL ENVIRONMENTAL ATTRIBUTES SELECTED?

A. Although Ohio law references the consideration of "environmental" factors, the Board generally includes other matters, such as socioeconomic, cultural, and land use data. Further, as I referenced previously, the Board is required to determine whether a particular route represents the minimum environmental impact, considering the state of available technology, and the nature and economies of various alternatives, and other pertinent considerations. So environmental impact must be balanced against cost, constructability, social impacts, and impacts to sensitive areas. The specific criteria used to assess these characteristics are discussed in the Application, each was reviewed for relevance and usefulness in helping to differentiate and select the Project routes.

Q. HOW MANY ROUTES DID THE RSS IDENTIFY AND RANK?

A. More than 100 possible route segments were identified by the Project siting team, when combined, resulted in over 75,000 possible route combinations (the precise number is difficult to come up with as we would not back track on routes). These segments represented alternative ways of connecting points along a corridor, typically along/parallel to city streets, highways, through commercial/industrial areas and railroad corridors. Many segments were initially proposed, then after review were set aside when space limitations, or other impediments were discovered. This would often involve backtracking and finding an alternative segment to determine if that corridor/route could still work. Engineering input was a critical factor in this process of finding segments that worked.

Ultimately, the routes under consideration fell into several main corridors: western routes, central railroad options, another central route, routes using a combination of interstate and railroad, and options that parallel Interstate 71.

Q. AFTER YOU COMPLETED THE SITING STUDY, ARE YOU AWARE OF ANY ADDITIONAL STEPS THAT THE COMPANY MAY HAVE TAKEN IN ORDER TO SUPPLEMENT YOUR RESULTS?

A. Yes.

Q. WHAT WERE THOSE STEPS?

A. After the initial assessment, the Company retained an engineering consultant, Wilboros, to provide an engineering and constructability analysis. The Wilboros study and the iterative review process resulted in the adjustment of some segments

and the addition of several new routes. In addition, some of the initial route alternatives were removed from consideration due to constructability challenges.

Q. FOLLOWING INITIAL PUBLIC COMMENT, DID YOU EVALUATE ADDITIONAL ROUTES, OUTSIDE OF THE ORIGINAL STUDY AREA?

A. Yes.

Q. WHAT WAS YOUR CONCLUSION?

A. We followed up on some comments that suggested we review routes farther to the east of our study area. This was really a re-evaluation as we had looked at eastern concepts before, prior to the detailed scoring phase. They were rejected based on factors including length and overall impacts, as well as the need to include a lateral into the central core area. Eastern routes, although apparently attractive based on the less dense residential development, are significantly longer (ultimately resulting in similar or larger impact totals compared to the central routes) and would require at least one additional lateral westward into the denser central core area to achieve the basic Project needs. However, to respond to comments raised at the public meetings and by local representatives, the Duke Energy Ohio siting team re-visited the eastern option in more detail and collected similar data to the route options scored and ranked in the siting study. It is important to note that this evaluation did not include data/impacts associated with an additional lateral into the central core.

Based on the re-evaluation, the eastern routes are up to 3 times longer than the central routes. Eastern routes as a group have substantially more ecological issues, predominantly tree clearing and stream crossings with some additional wetland impacts. Total land use impacts are generally comparable to or greater than

the central routes even though the land use density is lower. In other words, greater routing lengths but lower development densities ultimately resulted in equal or greater overall land-use impacts. Generally lower engineering and constructability challenges as a result of less build-out densities, with some exceptions through denser development "bottle-neck'" areas such as Milford, Eastgate, Newtown, and Anderson Township.

Note, however, that the preliminary routing analysis of these eastern routes did not include the routing impact of at least one additional high-pressure lateral that would have to be constructed across to the central route area to achieve the Project goals. One lateral would likely come from WW Feed Station down into Blue Ash to connect with Line A along the general alignment of Route 26 with the need and location for any additional laterals to be determined. There is therefore no advantage to eastern routes from a siting perspective, as they would result in greater overall Project impact.

Q. DID YOU ASSIGN WEIGHTS TO VARIOUS FACTORS IN YOUR EVALUATION?

A. We did not use criteria weighting in this study. We did test the effects of using a weighting factor on residential impacts in response to a concern expressed during one of the public meetings.

Q. PLEASE EXPLAIN.

A. In response to public concerns over possible land-use impacts, Duke Energy Ohio evaluated the effect of applying more emphasis, or weighting, to land use factors. Increased weighting of land-use factors, relative to the technical and ecological

factors, does not significantly change the route score rankings (even when land use is factored at three times as important as technical and ecological factors). It does promote routes that have some ROW adjacent to interstate (*i.e.*, with no residences within) in a few places, but does not change the limitations associated with those routes. The Pink and Orange Routes fare slightly worse, while the Green Route remains the second ranked option. The siting team concluded that, if such weighting had been used, it would not have changed the routes selected.

Q. OF THE ROUTES YOU EVALUATED, HOW DID THE PREFERRED AND ALTERNATE ROUTES SCORE IN RELATION TO THE BALANCE OF POTENTIAL ROUTES?

A. The preferred route, as discussed in the Application, ranked number six. The alternate route was ranked as number three. They scored close to the top of all the routes.

Q. PLEASE EXPLAIN WHY THE TWO ROUTES CHOSEN FOR SUBMISSION TO THE BOARD WERE NOT THOSE THAT RANKED NUMBERS ONE AND TWO.

A. Both scored well overall. The numeric analysis forms part of the siting study, and is valuable for highlighting the best and worst groups of route options. It does less well when more granular detail is needed and where qualitative factors are added. Review of constructability factors ultimately helped make the final decision.

III. ENVIRONMENTAL IMPACT

Q. WHAT IS THE BOARD REQUIRED TO DETERMINE WITH REGARD TO ENVIRONMENTAL IMPACTS OF THE PROPOSED PIPELINE?

A. Section 4906.10 of the Ohio Revised Code states, in subsection (A)(2) and (3), that the Board must find and determine "the nature of the probable environmental impact" and, as noted previously, "that the facility represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, and other pertinent considerations." Several sub-issues are generally considered under each of these categories.

Q. HOW DID YOU ADDRESS IMPACTS TO LAND USE, ECOLOGICAL RESOURCES, CULTURAL RESOURCES, AND SOCIOECONOMICS IN THE BOARD APPLICATION?

A. The Application rules require the applicant to provide specific data and/or tables to address land use, cultural, ecological and socioeconomic impacts of the project. This data is limited to the Preferred and Alternate routes identified in the application, and is used by the Staff to evaluate the overall project impacts and to subsequently compare the preferred and alternate routes. They are the final authority on whether the project is approved or rejected and whether the preferred or alternate is selected. Duke Energy provided all the required information to the Staff who found the application complete and concurred that Duke had satisfied all application requirements.

IV. CONCLUSION

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.