FILE

BEFORE THE
OHIO POWER SITING BOARD

In the Matter of: The Application of American Transmission Systems, Incorporated and The Cleveland Electric Illuminating Company for a Certificate of Environmental Compatibility and Public Need for the Geauga County 138 kV Transmission Line Supply Project	)	Case No. 07-0171-EL-BTX

INITIAL DIRECT TESTIMONY OF

DR. FRANCIS L. MERAT, PH.D., P.E.

ON BEHALF OF

CITIZENS ADVOCATING RESPONSIBLE ENERGY

Q. Please state your full name.

A. Francis L. Merat.

Q. Your business address?

A. Department of Electrical Engineering and Computer Science, Glennan 518, 10900 Euclid Avenue, Cleveland, Ohio 44106-7071.

Q. Dr. Merat, please describe your educational background.

A. I received a B.S. degree in electrical engineering, with high honors, from Case Western Reserve University in May, 1972. I received an M.S. in electrical engineering from CWRU in January, 1975. I received a Ph.D. in electrical engineering from CWRU in February, 1978. I am also a professional engineer licensed by the State of Ohio.

Q. Please describe your work history.

A. After receiving my Ph.D., I was a research engineer for the Department of Electrical Engineering and Applied Physics at CWRU. I then was appointed an Assistant Professor in the Department of Electrical Engineering and Applied Physics in October, 1979 and was made an Associate Professor in that department in July, 1985. I have maintained that position since. I also have tenure as a CWRU faculty member. In addition, I have held various administrative posts at CWRU, including Associate Chair and Interim Chair for Electrical and Computer Engineering, and have also spent a summer working for the United States Army and a summer working for the United States Air Force. I also have

served as a private consultant on various projects, including many litigation matters.

Q. Do you have any publications?

A. Yes, I have two book chapters published, and have published nearly twenty articles in peer-reviewed journals. I also have approximately seventy conference and other publications.

Q. Are you a member of any professional societies?

A. Yes, I am a member of a number of professional societies, including the I-triple-E, meaning the Institute of Electrical and Electronics Engineers, where I sit as a senior member, and the Society of Manufacturing Engineers.

Q. Dr. Merat, did you review and rely upon any documents in forming the opinions about what you were going to testify today?

A. Yes. I reviewed the Application which CEI filed with the Public Utilities Commission in support of its 1995 request to build the 138 kV power transmission line known as the "Rachel" line, as well as several other documents related to that proceeding. In addition, I reviewed the Application filed in the present matter, which I understand is referred to as the "Geauga Project," and a series of documents marked "confidential" by First Energy in that proceeding.

Q. Dr. Merat, in addition to the application in the Geauga proceeding, were there any non-confidential documents which you found especially helpful n understanding this matter?

A. Yes. There are three primary documents that are not confidential, and two of these are contained within the Application, in the Geauga Matter.

Q. Doctor, showing you what has been marked Exhibit ____, please identify what this document is.

A. This drawing is from the Application and is labeled "Figure 02-1." It shows the existing 36 kV circuit configuration for the portion of the FirstEnergy System's Geauga System which will be impacted by the proposed transmission line. It is particularly helpful because, although not to scale, it provides general locations for the various substations being served by each of the existing power lines.

Q. Dr. Merat, showing you what has been marked Exhibit ____, please identify this document.

A. This document is also from the application and is labeled "Figure 02-2" in the Application. This document is similar to the previous exhibit, in that it is a not-to-scale geographic depiction of the substations, but this drawing shows how the substations would be reconfigured and connected to the proposed new Stacy substation if the proposed transmission line is constructed.

Q. Dr. Merat, do either Figure 02-1 or 02-2 provide any electrical information useful to understanding how the system is configured, how the proposed revised configuration would be made, whether there is a need for this system or whether the proposed solution meets the need?

A. No. That information is contained only on confidential documents.

Q. Dr. Merat, showing you what's been marked Exhibit ____, can you identify that document?

A. Yes. This is an aerial photograph of the area involved in all of these transmission lines, upon which an overlay has been made, showing the location of the existing Q1-Q4 corridor, the Pine Grove substation, the line extension from Q1-Q4 to Pine Grove, the former B&O Railway grade, the Geauga Park District Bike Trail, the Ruth substation, the previously approved Rachel preferred route, and the Preferred Route and the Alternate Route at issue in this proceeding. It is my understanding that the overlays were prepared by Dr. Galm based upon information available from the Geauga County Auditor's website (which has aerial views of all parcels in Geauga County), and other documents in the Application and the Rachel Application.

Q. Dr. Merat, did you rely on any confidential documents in reaching the opinions about which you are going to testify?

A. Yes.

Q. Dr. Merat, I am going to go through the confidential documents which you reviewed so that we can identify the confidential documents upon which you relied. First, showing you what has been marked Exhibit ___, which is identified with the Bates number "ATSI-CEI-CON00000071," can you identify this document?

A. Yes. This is a two-page confidential internal First Energy memo.

Q. Did you rely, in part, on this document to reach the opinions about which you are going to testifying herein?

A. Yes.

Q. Showing you what has been marked Exhibit ___, bearing the abbreviated Bates numbers CON157 through CON219, can you identify this document?

A. Yes, this is a 2006 PowerPoint presentation prepared by First Energy regarding various options for the power line.

Q. Did you rely, in part, on this document to reach the opinions about which you are going to testify?

A. Yes.

Q. Showing you what has been marked Exhibit ___, which bears Bates numbers CON220 through CON241, can you identify this document?

A. Yes. This is a 2006 internal FirstEnergy study regarding the Middlefield area power project.

Q. Did you rely, in part, on this document to reach the opinions about which you are going to testify?

A. Yes.

Q. Showing you what has been marked as Exhibit ___, which bears the Bates numbers CON249 through CON289, can you identify this document?

A. Yes. This is a 2006 study prepared by URS for First Energy regarding the Middlefield system support project.

Q. Did you rely, in part, on this document to reach the opinions about which you are going to testiy?

A. Yes.

Q. Showing you what has been marked Exhibit ___, which bears Bates number CON290, can you identify this document?

A. Yes, this is a First Energy drawing showing the 36 kV load system, as depicted on Figure 02-1 in the application, but with voltage and load data for each of the substations identified.

Q. Did you rely, in part, on this document to reach opinions about which you are going to testify?

A. Yes.

Q. Showing you what has been marked Exhibit ___, which bears Bates number CON291, can you identify this document?

A. Yes. This is a line drawing of the system, similar to Figure 02-2 in the application, but showing all of the relevant load data.

Q. Did you rely, in part, upon this document to reach the opinions about which you are going to testify?

A. Yes.

Q. Dr. Merat, showing you what has been marked Exhibit ___, which is identified as Bates number CON295, can you identify this document?

A. Yes. This is a larger version of the document Bates stamped CON290, which is a line diagram of the 36 kV system, showing all of the relevant load data. It is somewhat easier to read than the smaller document.

Q. Did you rely, in part, on this document to reach the opinions about which you are going to testify?

A. Yes.

Q. Dr. Merat, showing you what has been marked Exhibit ___, which is identified as Bates number CON296, can you identify this document?

A. Yes. This is similar to the previous document, and is a larger version of the document identified by Bates number CON291, showing the 36 kV system and projected voltages and loads with the proposed 138 kV transmission line and the new Stacy substation and the resulting reconfiguration.

Q. Did you rely, in part, on this document to reach the opinions about which you are going to testify?

A. Yes.

Q. Dr. Merat, showing you what has been marked as Exhibit ___, which is identified by Bates number CON297, can you identify this document?

A. Yes. This is a line drawing of the Mayfield to Ashtabula 138 kV transmission line, showing existing loads on the line at each of seven electrical busses.

Q. Did you rely, in part, on this document to reach the opinions about which you are going to testify?

A. Yes.

Q. Dr. Merat, showing you what has been marked as Exhibit ___, identified as Bates number CON298, can you identify this document?

A. Yes. This is a line drawing of the Mayfield to Ashtabula 138 kV transmission line, showing load data for the electrical busses referenced in the previous document, with the addition of a loop to create the proposed Stacy substation and the projected load data for that proposed substation.

Q. Did you rely, in part, upon this Exhibit to reach the opinions about which you will testify?

A. Yes.

Q. Dr. Merat, showing you what has been marked as Exhibit ___, identified as Bates number CON294, can you identify this document?

A. Yes. This is another line drawing for the Mayfield to Ashtabula 138 kV transmission line, including the proposed Stacy substation and the transmission line proposed in this proceeding.

Q. Is this document identical to Exhibit ___ (Bates number CON298)?

A. No. It is similar and depicts a similar schematic, but some of the load numbers are different.

Q. Did you rely, in part, on this document to reach the conclusions about which you are going to testify?

A. Yes.

Q. Dr. Merat, showing you what has been marked as Exhibit ___, marked as Bates number CON292, can you identify this Exhibit?

A. Yes. This is another line drawing of the Mayfield to Ashtabula 138 kV transmission line, showing the various substations and the transmission

line at issue in this proceeding, but showing load data which is projected to occur if the Mayfield Q3 line were out of service.

Q. Did you rely, in part, on this document to reach the opinions about which you are going to testifying?

A. Yes.

Q. Dr. Merat, showing you what has been marked Exhibit ___, identified as Bates number CON293, can you identify this document?

A. Yes. This document is similar to the previous document, but it shows the projected loading condition if the Ashtabula Q3 line is out of service.

Q. Did you rely, in part, on this document to reach the opinions about which you are going to testify?

A. Yes.

Q. Dr. Merat, showing you what has been marked as Exhibit ___, also identified as CON299, can you identify this document?

A. Yes. This document is a detailed line drawing, showing substantial loading and voltage data for the existing 36 kV system in this area.

Q. Is this document identical to Exhibit ___ (Bates number CON290)?

A. No. It is similar and contains similar data, but it is not identical to that drawing.

Q. Dr. Merat, showing you what has been marked as Exhibit ___, identified as CON300, can you identify that drawing?

A. Yes, this is a drawing of the existing 36 kV system with the 138 kV transmission line and the proposed Stacy substation shown, the proposed

reconfiguration of the 36 kV system shown, and the resulting projected load data shown.

Q. Is this document identical to Exhibit ___ (identified as Bates number CON291)?

A. No. It is similar to that document and contains similar data, but the two documents are different.

Q. Dr. Merat, based upon your review of the foregoing documents, have you reached an opinion, from an electrical standpoint, whether the existing electrical system in the Middlefield area, is in need of strengthening?

A. Yes. The voltage levels and load levels at various substations, and the length of several of the circuits, particularly MF-22, show that strengthening of this system, by some means, is something which appears to be justified.

Q. Is there only one method to effect that strengthening, from an electrical standpoint?

A. No, there is a large variety of solutions which could be employed.

Q. Does the solution proposed by installation of the Preferred Route, including the installation of a new Stacy substation and the reconfiguration of the existing 36 kV system address the problem from an electrical standpoint?

A. Yes, it does appear to do that.

Q. Does the proposed Alternate Route, including the addition of the Stacy substation and the reconfiguration of the 36 kV circuits also address that problem from an electrical standpoint?

A. Yes, it appears to address the problem in a similar fashion.

Q. Dr. Merat, Exhibit ___ (CON290), Exhibit ___ (CON291), Exhibit ___ (CON295), Exhibit ____ (CON296), Exhibit ____ (CON297), Exhibit ____ (CON298), Exhibit ____ (CON299), and Exhibit ____ (CON300) were all filed with the Ohio Power Siting Board as "sealed" documents are are unavailable to the public. Referring collectively to these eight documents as the "sealed documents," could you have determined whether or not a need exists for either the Preferred Route or the Alternate Route without reviewing the data contained in the sealed documents?

A. No.

Q. Could you have determined that either the Preferred Route or the Alternate Route meets this need without reviewing the date contained in the sealed documents.

A. No.

Q. Are you familiar with the system strengthening that was proposed in the Rachel application?

A. Yes.

Q. Do you have an opinion, to a reasonable degree of certainty, whether from an electrical standpoint, the system strengthening proposed in the Rachel

Application and the 138 kV transmission line proposed in the Geauga Application would provide a similar solution?

A. Yes.

Q. What is that opinion?

A. I believe that the solution proposed in Rachel would provide an electrical solution that is nearly identical to the construction of the transmission line proposed in the Geauga Application for either the Preferred or the Alternate routes.

Q. Was the Rachel circuitry designed in an identical fashion?

A. No, the Rachel circuitry was a tie-in, and the proposed Geauga solution involves a loop.

Q. From an electrical standpoint, does it make a difference that Rachel was a tie-in and that Geauga is a loop system?

A. No, the end result is the same.

Q. Is the construction of the two types of circuits substantially different?

A. No, separate configurations have to be made where the transmission lines are connected and there is slightly different circuitry at the southern substation, but basically the two methodologies are very compatible.

Q. Are you familiar with a discussion regarding a possible transmission line from the Pinegrove substation to the Ruth substation?

A. Yes, I am aware that this issue has been looked at in a preliminary sense.

Q. Do you have an opinion, to a reasonable degree of engineering certainty, as to whether the construction of a 138 kV transmission line from the

Pinegrove substation to a new substation adjacent to the Ruth substation would have the same beneficial effect to the Middlefield problem as the construction of the Preferred Route or the Alternate Route?

A. Yes.

Q. What is that opinion?

A. From an electrical standpoint, the Pinegrove to Ruth transmission line would have the same beneficial effect as the proposed Preferred Route or the proposed Alternate Route.

Q. Are there complicating factors to such a line?

A. There are complicating factors, but not prohibitive factors. The line from the 138 kV Q1-Q4 line to Pinegrove is, as I understand it, a "tapped" line. However, with the extension of a circuit from Pinegrove to the Q1-Q4 corridor, meaning the addition of a second circuit, the loop configuration provided for in the Alternate Route and the Preferred Route could still be achieved. Alternatively, the design could be made – as it was in Rachel – for a simple tie-in, which could simply be done from Pinegrove.

Q. Do you have an opinion, to a reasonable degree of engineering certainty, as to whether the construction of a power line along the Mayfield Road corridor, from the Mayfield substation to a new Stacy substation would achieve, from an electrical standpoint, the same result as the construction of the Preferred Route or the Alternate Route?

A. Yes.

Q. What is that opinion?

A. The Mayfield to Stacy option would produce the same electrical result as the Preferred Route or the Alternate Route.

Q. Please explain your conclusion.

A. Referring to Exhibit ___ (CON071), I learned that First Energy has already constructed much of MF-22 on the south side of Mayfield Road with 795 ACSR wire and 138 kV spacing. According to that memo, First Energy constructed this in contemplation of installing a single circuit 138 kV line between the north-south bulk power transmission corridor in western Geauga County and the Sandborn station in Orwell, which is located substantially to the east of the proposed Stacy substation.

Q. Do you have an opinion, to a reasonable degree of engineering certainty, whether the construction of a 138 kV line from the Mayfield substation to the proposed Stacy substation would strengthen the Middlefield system at issue?

A. Yes, even the construction of a single circuit 138 kV line, as identified in the March, 2007 memorandum, would strengthen the system serving Middlefield.

Q. Do you have an opinion, to a reasonable degree of engineering certainty, whether the construction of a two circuit 138 kV line on Mayfield Road from the Mayfield substation to the proposed Stacy substation would serve the same purpose as the proposed Preferred Route or proposed Alternate Route?

316 A. Yes. From an electrical standpoint, running the transmission line from the
317 Mayfield substation to the Stacy substation would accomplish the same
318 end result as constructing the line as proposed in the Preferred or
319 Alternate routes.
320 Q. Have you evaluated, from an electrical standpoint, the feasibility of
321 constructing a transmission line from the Mayfield to Ashtabula Q1-Q4
322 corridor utilizing the Route 11 right of way?
323 A. Yes, in a general sense.
324 Q. Do you have an opinion, to a reasonable degree of engineering certainty,
325 whether it would be feasible from an electrical standpoint to construct a
326 138 kV transmission line from the Mayfield to Ashtabula corridor utilizing
327 the State Route 11 right of way in order to address the identified
328 Middlefield problems?
329 A. Yes. From an electrical prospective, bringing the transmission line from
330 Ashtabula down the Route 11 corridor, and then west on Mayfield Road to
331 or beyond Orwell would accomplish the same general result, although the
332 specific location of the substation would have to be evaluated with respect
333 to the load centering goals of this project.
334 Q. Are you aware of any other solutions to the problems identified in the
335 application?
336 A. I am not aware of specific solutions, but I am aware that other possible
337 solutions do exist. Exhibit ____ (CON157, et seq.), Exhibit ___ (CON220,
338 et seq.), and Exhibit ___ (CON249, et seq.) all speak of the Ohio Edison

69 kV system, which is owned by First Energy. Based upon the information provided, it appears that the 69 kV system in Trumbull County is in need of strengthening, although few details are supplied. Several of the options discussed in the referenced exhibits make this fact clear and also involve the utilization of the 69 kV system. However, I do not have enough information to determine whether a viable option, from an electrical standpoint, exists utilizing the 69 kV system or in conjunction with the strengthening of that system as may otherwise be necessary, but the possibility that a more regional solution, addressing both the Trumbull County and Geauga County problems might be viable, and this is at least suggested by these documents.

Q. Dr. Merat, I would like to draw your attention to Exhibits ___ and ___ (CON297 and CON298) which are also identified as Figure 1 and Figure 2 and are filed with the Ohio Power Siting Board in this proceeding. What are the designations "Mayfield" "Pinegrove" "LeRoy Center" "Spruce" "Sanborn" "Ashtabula" in that drawing?

A. These are 138 kV substations which transform the 138 kV to a lower voltage for distribution.

Q. Dr. Merat, looking at the drawing, each of these substations are represented by long vertical rectangles, is that correct?

A. Yes.

Q. Dr. Merat, the third rectangle from the left has no designation at the top, is that correct?

A. Yes.

Q. Can you tell what the rectangle signifies?

A. It appears to signify the Rachel bus, especially because at the bottom of the rectangle there is a designation 02RA Q-3. And because, looking at the load information, it appears to be a substation with no load.

Q. What is the significance of this?

A. Well, it certainly appears that FirstEnergy has kept the Rachel line in its computer modeling programs, at the location where it was designed to be in the 1997 Certificate of Need.

Q. Why would FirstEnergy keep the Rachel line in its models if it does not intend to build that line?

A. I cannot think of any reason why it would do so.

Q. Dr. Merat, are you a member of CARE?

A. No I am not.

Q. Are any of your family members members of CARE?

A. No.

Q. Do you own any real property that would be impacted by either the Preferred Route or the Alternate Route?

A. No.

Q. Do any of your family members own real property that would be impacted by either route?

A. No.

384 Q. Are you being compensated for your investigation into these issues or

385 your testimony?

386 A. No.

CERTIFICATE OF SERVICE

I hereby certify that a true and accurate copy of the foregoing Citizens Advocating Responsible Energy's Initial Direct Testimony of Francis L. Merat, Ph.D., P.E. was served this 8th day of September 2008, via regular U.S. Mail upon the following:

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