COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P.O. BOX 3265, HARRISBURG, PA 17105-3265

ISSUED: August 19, 1992

IN REPLY PLEASE
REFER TO OUR FILE

A-110550F055

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Letter of Notification of
Philadelphia Electric Company
Relative to Reconstructing and
Rebuilding of the Existing 138
kV Line to Operate as the
Woodbourne-Heaton 230 kV Line
in Montgomery and Bucks Counties

TO WHOM IT MAY CONCERN:

Enclosed is a copy of the Initial Decision of Administrative Law Judge Herbert Smolen. This decision is being issued and mailed to all parties on the above specified date.

If you do not agree with any part of this decision, you may send written comments (called Exceptions) to the Commission. Specifically, an original and nine (9) copies of your signed exceptions MUST BE FILED WITH THE SECRETARY OF THE COMMISSION IN ROOM B-18, NORTH OFFICE BUILDING, NORTH STREET AND COMMONWEALTH AVENUE, HARRISBURG, PA OR MAILED TO P.O. BOX 3265, HARRISBURG, PA 17105-3265, within twenty (20) days of the issuance date of this letter. The signed exceptions will be deemed filed on the date actually received by the Secretary of the Commission or on the date deposited in the mail as shown on U.S. Postal Service Form 3817 certificate of mailing attached to the cover of the original document (52 Pa. Code §1.11(a)) or on the date deposited with an overnight express package delivery service (52 Pa. Code 1.11(a)(2), (b)). If your exceptions are sent by mail, please use the address shown at the top of this letter. A copy of your exceptions must also be served on each party of record. 52 Pa. Code §1.56(b) cannot be used to extend the prescribed period for the filing of exceptions/reply exceptions.

If you receive exceptions from other parties, you may submit written replies to those exceptions in the manner described above within ten (10) days of the date that the exceptions are due.

Exceptions and reply exceptions shall obey 52 Pa. Code 5.533 and 5.535 particularly the 40-page limit for exceptions and the 25-page limit for replies to exceptions. Exceptions should clearly be labeled as "EXCEPTIONS OF (name of party) - (protestant, complainant, staff, etc.)".

If no exceptions are received within twenty (20) days, the decision of the Administrative Law Judge may become final without further Commission action. You will receive written notification if this occurs.

ALJ SMOLEN, OFFICE OF ALJ, CHAIRMAN, COMMISSIONERS, OSA, LB, S&C, PIB, NEW FILING, OUR FILE, OTS

Very truly yours,

Allison K. Turner

Allison K. Turner
Chief Administrative Law Judge

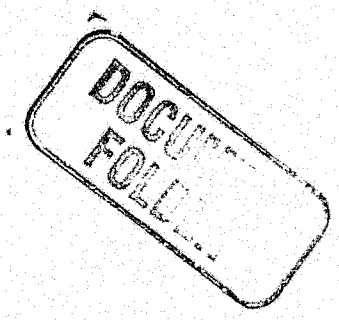
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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as the Woodbourne-Heaton 230 kV Line in Montgomery and Bucks Counties	:	Docket Number A-110550F055

INITIAL DECISION



Before
HERBERT SMOLEN
Administrative Law Judge

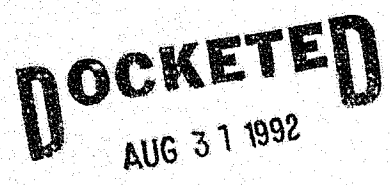


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I. HISTORY OF THE PROCEEDING

On November 21, 1989, Philadelphia Electric Company (PECO), in lieu of a formal siting application, filed a Letter of Notification to the Pennsylvania Public Utility Commission (Commission) pursuant to 52 Pa. Code §57.72(d)(1) proposing to reconstruct and reconductor, as the Woodbourne-Heaton 230 kV transmission Line, a former railroad 138 kV transmission Line owned by Consolidated Rail Corporation (Conrail) and located along a Conrail rail Line known as the Trenton Cut-off Branch freight line. PECO had purchased an easement from Conrail along this rail line together with the structures supporting the former 138 kV line, and proposed to construct an approximate 12.8 miles long 230 kV transmission line along the railroad right of way to connect the Woodbourne and Heaton substations.

PECO duly served copies of the Letter Notification in accordance with 52 Pa. Code §57.72(d)(3) upon the governmental parties entitled to notice. Thereafter, by Order entered February 9, 1990, the Commission approved the Letter of Notification.

Subsequently, on September 14, 1990, certain property owners who live along the railroad corridor (Petitioners or Protestants) filed an Emergency Petition of Non-Noticed Property Owners to Intervene, For Reopening and To Suspend Approval (Emergency Petition) of PECO's Letter Notification for the Woodbourne-Heaton transmission line. In the Emergency Petition,

Petitioners alleged, inter alia, that they did not receive notice of the proposed reconstruction of the transmission line and that they were entitled to notice because they owned air space adjacent to the right of way through which electromagnetic fields (EMF) from the line could be dispersed. Petitioners further asserted that one of them owned property within PECO's right of way, and that PECO had improperly used the Letter of Notification Procedure. Petitioners requested that the proceeding be reopened so that they might address issues of local zoning, diminution of property values, aesthetics, increased risks of fires, and the risk of EMF from the line causing cancer. Petitioners are members of the group PAUSE (Parents Against an Unsafe Environment) which was an additional Petitioner.

On September 18, 1990, PECO duly filed an Answer to the Emergency Petition, denying all allegations therein, and asserting, inter alia, that it was in compliance with all Commission regulations; and that if there was a taking of property rights as alleged, it was a matter for the courts; and that construction of the line had to continue or else the public's electric service would be in serious jeopardy. On December 27, 1990, Petitioners filed a letter supplementing the original Emergency Petition. Thereafter, on January 3, 1991, the Office of Consumer Advocate (OCA) filed a Notice of Intervention and a Statement in Support of the Emergency Petition (Statement

in Support), but took no position on the merits of PECO's request, nor upon the merits of the Petitioners' objections to the Letter Notification.

On January 2, 1991, PECO filed a response to Petitioners' supplemental letter, and on January 10, 1991, PECO filed a Reply to the OCA's Statement in Support, asserting therein, inter alia, that there was no legal basis for reopening the proceeding; that PECO had followed the Commission regulations at 52 Pa. Code §57.71; and that the Commission had already "adequately considered" all elements of safety in approving the Letter of Notification.

By Order entered March 8, 1991, the Commission denied the Emergency Petition and the request for stay of construction, concluding that the Petitioners had failed to prove sufficient grounds for reopening the record, and had not met the standard for the granting of a stay.[1]

On April 2, 1991, the Petitioners filed with Commonwealth Court a Petition for Review of the Commission's March 8, 1991 Order. Robert Small, et al. v. Pa. P.U.C., No. 761 C.D. 1991. On or about April 8, 1991, the Petitioners filed with

---

[1] Commissioner (now Chairman) Rolka dissented from the Opinion to the extent that the Petitioners had adequately raised new and novel issues warranting reconsideration of the Order approving the line, but agreeing as to the decision upon the request for stay. Dissenting Opinion of Commissioner David W. Rolka at 1.

the Commission the Petition of Small, et al., for Stay Pending Appeal to which PECO replied on April 15, 1991. On May 8, 1991, the Commission denied the Petition.

On April 26, 1991, the Petitioners filed with Commonwealth Court a Petition for Stay Pending Review of the Commission's March 8, 1991 Order. The OCA intervened in the Commonwealth Court Appeal on April 26, 1991 (No. 761 C.D. 1991). On May 13, 1991, the Commission filed its Answer to the Petition of Small, et al. for Stay Pending Review.

On May 22, 1991, the Commonwealth Court heard argument and on May 24, 1991, issued a Memorandum Opinion and Order wherein the Court, by the Honorable Madaline Palladino, ordered a remand to the Commission for a hearing within 90 days upon the question of whether "they (the Petitioners) will be adversely affected by the reconductoring of the high tension line at issue in this case." Commonwealth Court Order of May 24, 1991 at 2. On May 29, 1991, Judge Palladino issued a Supplemental Order relinquishing jurisdiction over the Appeal.

By Order of June 14, 1991, the Commission reopened the case for hearing and determination on the sole issue of whether Petitioners will be adversely affected by the reconductoring of the line; granted the Petition for Hearing filed by Petitioners June 3, 1991 to that extent; and ordered a hearing for not later

than August 22, 1991 on that issue. On June 26, 1991, the Prosecutory Staff entered its appearance in the case.

Thereafter, a telephonic prehearing conference was held on July 11, 1991 following which the Administrative Law Judge issued a Prehearing Order relating, inter alia, to certain issues raised by the parties in their respective prehearing memoranda.

In the Prehearing Order of July 18, 1991, the Administrative Law Judge pointed out that the instant matter was initiated, as aforesaid, by PECO's Letter of Notification filed under 52 Pa. Code §57.72(d) in lieu of an Application. This regulation requires, inter alia, that certain information be contained therein. See 52 Pa. Code §57.72(d)(4)(i), and particularly, the information described in subsection (c)(6). Said subsection (c)(6) requires a statement of safety considerations which will be incorporated into the design, construction and maintenance of the proposed HV line. Thus, the Administrative Law Judge, in his Order of July 18, 1991, concluded that PECO only had the burden of proof and of going forward as to those items required to be submitted under 52 Pa. Code §57.72(d)(4) so as not to impose any greater or lesser burden upon PECO than was required under the Letter of Notification regulation which the Commonwealth Court did not vitiate or overturn except to afford Petitioners an opportunity to be heard on the issue as to whether they would be adversely

affected by the reconductoring of the line. Indeed, PECO did go forward with the presentation, inter alia, of safety testimony, including design and detailed data on electric and magnetic fields that would be associated with the line. Thereafter, Petitioners/Protestants and all other parties asserting similar claims had the burden of proof and of going forward with the evidence in connection with their respective contentions concerning alleged adverse effects from the line. (Petitioners and the OCA did present such evidence to which PECO presented rebuttal evidence.)

Subsequently, on August 20, 1991, Petitioners (hereinafter now referred to as Protestants) moved to dismiss PECO's Application (i.e., Letter of Notification), or in the alternative, that the proceedings encompass all relevant issues, including the issue of the "need" for the line. Prosecutory Staff answered, stating that the "need" for the line had been established by PECO and determined by the Commission in its February 9, 1990 Order. The Motion was denied on September 20, 1991 for those reasons set forth at N.T. 436-437.

It must also be noted that in May 1991, Protestants had served written requests for discovery upon the Prosecutory Staff to which objections were filed in July 1991. These requests were essentially directed to the Commission. Protestants also moved to compel answers to its discovery. The Commission entered an

Order on December 12, 1991, following Commissioner Rhodes' Motion on October 23, 1991, that the Prosecutory Staff comply with certain of Petitioners' requests, while not providing any advisory memoranda or reports on EMF. Additional discovery ensued during the course of the proceeding.

Hearings were held on August 15, September 6, 19, 20, October 15, 16, November 19, 20, 22, December 16, 17, 1991 and February 7, 1992, at which Protestants, PECO and OCA presented various witnesses and introduced numerous exhibits. The record consists of 1523 pages of transcript and the aforesaid exhibits. Main Briefs were filed on April 21, 1992 and Reply Briefs on May 12, 1992.

II. INTRODUCTION

At the outset, it must be recognized that the Administrative Law Judge in this proceeding is not called upon to determine the scientific question as to whether EMFs contribute to or cause adverse human health effects. That is clearly a matter for the scientific community to investigate, experiment, debate and determine. Nor is it the function of the Administrative Law Judge or within his authority to overrule, modify or otherwise rescind prior Orders of the Commission. That is within the province of the Commission itself and/or the appropriate appellate courts. The foregoing was aptly noted by

the OCA in its Main Brief, page 14, where it is stated, inter alia:

> The OCA recognizes that the Administrative Law Judge, as the Presiding Officer in the case, must work within the Orders issued in this proceeding, and that it is not within the power of the ALJ to reconsider prior orders of the Commission.

Therefore, the framework of this proceeding and the mandate to the Administrative Law Judge by the Commonwealth Court and the Commission must be clearly understood so as to differentiate it from other high voltage transmission line siting cases and their respective procedural stages and substantive issues.

In the instant matter, PECO's Letter of Notification to reconstruct and reconductor the transmission line in issue has already been approved by Commission Order entered February 9, 1990, and in its subsequent Order entered March 8, 1991, the Commission stated, inter alia,

> In its order on PECO's Letter of Notification, the Commission considered public need for the proposed line, and we stated that the proposed line would "provide a second source of 230 kV supply for both the Woodbourne and Linton substations, thus preventing line overloads and low voltage conditions in the event of an outage of the Buckingham-Linton 230 kV line segment." Order entered February 9, 1990 at A-110550, F.55, p. 2. The Commission's order also stated that the need for this back-up line was precipitated by the area's high load growth which also required the expansion of distribution facilities as well as the

construction of new distribution facilities. Id. at pp. 2-3. As to safety of the line, the Commission noted that the line would be designed, constructed and maintained in accordance with the National Electric Safety Code and that minimum standards would be met or exceeded. Id., p. 3.

Aesthetics and environmental impact of the proposed 230 kV were also considered by the Commission in finding that the existing utility right-of-way was not significantly altered by PECO's reconstruction of Conrail's 138 kV line.

> Analysis of the foregoing detail reveals that in this case, PECO proposes to utilize an existing utility corridor on which there is erected an existing (but now abandoned) 138 kV transmission line as a common corridor for the proposed 230 kV transmission line. Consequently, the rebuilding and reconductoring of the existing 138 kV transmission line into a single circuit 230 kV transmission line utilizing most of the existing support structures will not alter the existing right-of-way. Moreover, the now-abandoned railroad electrification is more than 50 years old, and most of the industrial and residential properties adjacent to the railroad right-of-way were constructed with the railroad transmission line and catenary system already in place, implying at least some acceptance thereof.
>
> Id., p. 3.

As aforesaid, the Administrative Law Judge does not have the power, authority or discretion to revoke, rescind or otherwise modify those Orders. Instead, the parameters of this

proceeding have been defined by the Commonwealth Court in Small et al. vs. Pa. P.U.C., No. 761 C.D. 1991, Slip Op. at 2 (May 24, 1991) which concluded

> . . . that Petitioners are entitled to a hearing on the question of whether they will be adversely affected by the reconductoring of the high tension electrical line at issue in this case . . .

and ordered the

> . . . the case remanded to the PUC to hold a hearing on this issue . . .

Subsequently, by Order adopted and entered June 14, 1991, the Commission ordered, inter alia, "[t]hat pursuant to Judge Palladino's May 24, 1991 order as supplemented by order dated May 29, 1991 the record at Docket No. A-110550, F.055, be hereby reopened for hearing and determination of the sole issue of whether the Petitioners will be adversely affected by the reconductoring of this formal Conrail transmission line" and "[t]hat the Office of Administrative Law Judge expeditiously schedule a hearing for not later than August 22, 1991 for the sole purpose of determining whether the Petitioners will be adversely affected by the reconductoring of the former Conrail transmission line by Philadelphia Electric Company." (Emphasis supplied)

The role of the Administrative Law Judge in this proceeding, therefore, must be guided by, and indeed is bound by these directives. Thus, the Administrative Law Judge must

determine whether the record evidence presented by the parties is sufficient to support a finding that Petitioners will be adversely affected by the reconductoring of the line at issue. It is not, repeat, not to scientifically determine, one way or the other, for all time, whether EMFs cause or contribute to adverse human health effects. It is, however, as aforesaid, to determine within the framework of the record adduced in this particular case, whether or not there is sufficient record evidence to support a finding that Petitioners will be adversely affected by the reconductoring of the line at issue.

Toward this end, the parties have framed various issues and presented evidence and arguments thereon. These issues can be summarized as follows:

I. Does the record support a finding that persons who own land adjacent to the proposed transmission line right of way will be adversely affected by the reconstruction and/or reconductoring of the transmission line.

   A. Whether electric and/or magnetic fields (EMF or power frequency fields) associated with the line will cause adverse health effects.

   B. Whether the construction, operation and maintenance of the line will cause adverse land-use effects.

   C. The concept of prudent avoidance.

In connection with the foregoing issues, the request of Commissioner Rhodes (June 14, 1991) for certain information was also responded to at the hearings. All of the foregoing items are addressed herein.

By way of further introduction to the subject matter of this case, some general explanation of what electromagnetic fields (EMFs) are is appropriate. PECO witness Silva (PECO Rebuttal Statement No. 6 [Silva] at 8-10) explained as follows:

> A field is a space or region in which an influence can be said to exist. For example, a temperature field is said to exist in the space around a hot or cold object. Two types of fields are produced by 60 Hertz (Hz) devices: electric fields and magnetic fields. All electric devices, including electric power lines and even household appliances, can produce these fields.
>
> The earth itself has a static or DC electric field of about 0.15 kV/m. Static electric fields can also result from taking off a sweater or walking across a carpet. Induced body voltages as high as 4,000 to 8,000 volts (and higher) have been measured for walking across a carpet. In addition to an electric field, the earth has a static magnetic field. In Southeastern Pennsylvania the earth's magnetic field is about 560 milligauss. It should be noted that since the earth's fields are primarily static fields rather than alternating fields, they do not necessarily compare directly with 60 Hz AC fields.

With respect to 60 Hertz (Hz), the witness continued that,

> Hz is a unit of frequency - frequency relates to the number of alternations or cycles of a wave during a period of time. The term 60 Hz means 60 cycles per second. For alternating current (AC) electric power lines like the

> one at issue here, the voltage and electric current reverse polarity, or direction, at a rate of 60 complete alternations or cycles per second. If there are no alternations, this is said to be direct current (DC), or static. For a static field, the frequency is 0 Hz.

In connection with 60 Hz <u>electric</u> fields, it was explained that

> A 60 Hz electric field is the field associated with the voltage on the conductors (energized wires) of an electric power line or device. The units commonly used to describe an electric field are volts per meter (V/m) or kilovolts per meter (kV/m). One of the characteristics of a 60 Hz electric field is that it decreases with distance away from the source. Electric fields are also easily shielded by objects such as trees.

and that

> In general, electric fields are a function of the voltage on the line, phasing, the geometry or configuration of the device, and distance away from the source of the fields.

In describing 60 Hz <u>magnetic fields</u>, the witness stated that

> A 60 Hz magnetic field is the field associated with the flow of electric current (or amperes) on electric lines or devices. The most common unit used by engineers for describing magnetic fields (actually the magnetic flux density) is the Gauss (G). Often a much smaller unit, the milligauss (mG), is used. One milligauss equals one one thousandth of a Gauss (1 mg = .001 G). One of the characteristics of a 60 Hz magnetic field is that it decreases with distance away from the source. Magnetic fields are not easily shielded by objects such as trees.

and that

> In general, magnetic fields are a function of the current (loading in amperes), phasing, the geometry or configuration of the device, and distance away from the source of the fields.

It is to be further noted that

> Electric and magnetic fields are created whenever there is a flow of electricity. Household wiring, electric transmission and distribution facilities, lighting, appliances, and office equipment are all common sources of electric and magnetic fields. The 60 Hz field is higher close to the source of the field and attenuates (decreases) with distance from the source; the fields attenuate more quickly with distance away from household appliances than from power lines.

The OCA, in its Main Brief, pages 22-25, is also helpful in this regard. There, it is stated,

> The phrase electromagnetic fields, or "EMFs" is a short-hand way of referring to both the electric and magnetic fields that exist when electricity is present. It is important to note from the outset that there are two fields under discussion, the electric field and the magnetic field. OCA St. 1 at 2-3. As PECO witness Boeggeman explained, a field is a space or region in which an influence can be said to exist. PECO Direct No. 2 at 4. Electric and magnetic fields exist whenever electricity is present. Id. For a transmission line, such as the line at issue in this case, an electric field is created by voltage and expressed in the unit of measure of kilovolts per meter (kV/m). PECO Direct No. 2 at 5. The electric field is present at all times that the transmission line is energized.
>
> The magnetic field is created by the flow of current on the transmission line. PECO Direct No. 2 at 5. The measure of the

magnetic field is expressed in milligauss (mG). PECO Direct No. 2 at 5. If there is no current on the transmission line, then there is no magnetic field created. Tr. 47. Conversely, the higher the current on the line, the higher the magnetic field. OCA St. 1 at 3; PECO Direct No. 2 at 5. The current that will flow on a line is also referred to as "loading" to represent the different amounts of current that will flow on the line depending on different conditions. PECO Direct No. 2 at 7.

The electric and magnetic fields that are created by a transmission line are often referred to as "weak" fields. OCA St. 1 at 2. OCA witness Janes explained the use of the term "weak" fields as follows:

> I call electric and magnetic fields "weak" if the current density they induce in tissue is too small to affect the function of critical tissues such as the heart and central nervous system.
>
> * * *
>
> Since most environmental exposures to electric fields are less than 8 kilovolts per meter and environmental exposures to magnetic fields are well below 5,300 milligauss, environmental exposures involve weak electric and magnetic fields . . .

OCA St. 1 at 2-3. As Mr. Janes explained, the typical electric fields for high voltage transmission lines range from about 1 kV/m to 12 kV/m for the maximum field and from about 0.4 kV/m to 2.3 kV/m at the edge of the right of way. OCA St. 1 at 3 and Table 1.

The typical magnetic fields under high voltage transmission lines are variable depending on the "loading" of the line. Typical values, however, fall in the range of

20-140 mG under the center of the transmission line. It is important to note that both electric and magnetic fields decrease with distance from the source. PECO Direct No. 2 at 6.

For PECO's 230 kV single circuit line, PECO has calculated a maximum right of way electric field of 1.9 to 2.3 k/Vm, with electric fields at the edge of the right of way of 1.2 to 1.3 kV/m. OCA St. 1 at 3. The magnetic fields for this 230 kV transmission line will vary depending upon the "loading" of the line. Under what PECO projects to be normal loading conditions, the maximum field on the right of way has been calculated to be 42 milligauss. At the edge of the right of way, PECO calculates the magnetic field under normal loading to be 25 milligauss. PECO Direct No. 2 at 8-9. Under heavy or emergency loading conditions, however, these values will be greater. Under heavy loading conditions, the expected magnetic field is 70 milligauss in the middle of the right of way and 42 milligauss at the edge of the right of way. PECO Direct No. 2 at 9.

Both electric fields and magnetic fields induce currents in objects placed in the field. OCA St. 1 at 2. The electric fields that are induced inside the body are weaker than the external unperturbed and surface electric fields. OCA St. 1 at 5. The interaction of magnetic fields with people and animals is different from electric fields, however. As Mr. Janes explained:

> The interaction of power frequency magnetic fields with humans and animals causes currents inside the body, but unlike electric fields, magnetic fields are not intensified at the surface of the body.

OCA Statement No. 1 [Janes] at 6.

A. Specific Information Requested by Commissioner Joseph Rhodes, Jr.

1. Expected Level of Electromagnetic Fields

PECO witness Boeggeman presented detailed data on the electric and magnetic fields that would be associated with the conventional designs that are used for 230 kV transmission lines, i.e., compact delta, flat, vertical and longer span delta (PECO Statement No. 2 [Boeggeman] at 11; N.T. 57). This information is set forth in detail in PECO Exhibit No. 2.

As to how the field levels were calculated, the witness explained that computer programs have been developed for this purpose. One program used by PECO is called "ENVIRO" which was developed for the Electric Power Research Institute (EPRI).

Using the compact delta design (the one used for the Woodbourne-Heaton line), the electric field levels are presented in PECO Exhibit 2, Table 1. The highest electric field level in the middle of the right of way will be 1.87 kV/m. At the edge of the right of way, the electric field is approximately 1.2 kV/m, and the electric field continues to decrease farther away from the line. Table 1 also provides electric field values for distances 300 feet either side of the center line. Figure 1-1 is a field profile showing the information in graphic form (PECO Statement No. 2 [Boeggeman] at 6-7).

With respect to the magnetic fields that will be associated with the Woodbourne-Heaton line, the witness prepared

calculations for five different "loading" conditions (five different currents) on the line, as follows:

Loading Condition	Expected Current	Magnetic Fields (in milligauss) Middle of R/W	Edge of R/W
Emergency Minimum	0 amperes	0	0
Light load) will occur for) over 90%of the Normal load) time the line is) operating	180 amperes	21	13
	360 amperes	42	25
Heavy load	600 amperes	70	42
Emergency Maximum (not to exceed 4 hours per year)	1,000 amperes	117	70

Magnetic fields at various loads at other distances from the center line of the right of way are presented in PECO Exhibit No. 2, Table 2. In addition, Table 3 of the Exhibit provides a comparison of electric field levels produced by the compact delta design and the other alternative design configuration. Table 4 presents a comparison of the magnetic field levels.

2. Line Design

PECO witness Oedemann described the design of the Woodbourne-Heaton Line as follows:

> This line will use many of the existing structures that were used by Conrail for its transmission facility. The line will be supported on single steel poles with three phase conductors (i.e., those wires that are carrying electrical energy) in a compact triangular (also known as delta) configuration and a ground wire (designed for lightning protection) attached to the top of

> the structure. The three phase conductors are arranged in a form that represent a triangle with two being on one side of the supporting pole and one being on the other. A diagram illustrating this configuration is attached as part of PECO Exhibit 1.

(PECO Statement No. 1 [Oedemann] at 5-6)

In explaining why the compact delta configuration was used for the line, the witness responded,

> The existing structures are approximately 300 feet apart. This distance is appropriate for a compact delta configuration.

(PECO Statement No. 1 [Oedemann] at 6)

III. SUMMARY OF TESTIMONY

A. Protestant's Case

Edward Koerper of 300 Casey Circle, Huntingdon Valley, Upper Southampton Township, testified that the proposed line is 143 feet from his residence. It is a distance of 63 feet from the edge of the Conrail right-of-way to his home. The power line pole is 80 feet from his property line. The right-of-way abuts his backyard for its entire length of 200 feet (N.T. 97-100).

Mr. Koerper testified that he is married and has two young girls, ages three and four. The children have toys and swings in the backyard and play there often. There is also a patio used for family meals in the summertime (N.T. 99-100).

Both the PUC and PECO, Koerper testified, have told him and his family to practice prudent avoidance. He first met with

PECO representatives in August 1990. His family was told of the possible EMF risk and were then, and later, advised to practice prudent avoidance (N.T. 110).

Mr. Koerper testified that he has done a lot of reading and research on prudent avoidance and EMF. He was not reassured by a California PUC study which indicated that there were without doubt biological effects of EMF (N.T. 103, 112).

With respect to the possibility of the line being energized, Mr. Koerper testified that his family situation now is one of turmoil. If the line were energized, the environment of the property would change and he knows his family could not practice prudent avoidance. He could not shield his family from EMF; therefore he thinks he would have to move (N.T. 103-104). Such a move presents real problems because he could not morally sanction selling his house to another family knowing what he knows about the EMF risk (N.T. 109).

Mr. Koerper also explained the basis of his concern about EMF: from his first meeting with PECO representatives in August 1990 at the time the project was first begun, to his reading of the report on the $2 million EMF study undertaken by California's Public Utility Commission which indicated that biological effects were caused by EMFs (N.T. 110-112).

On cross-examination, the witness expressed his understanding of what prudent avoidance is: to reduce the EMF

that we come into contact with in our daily lives because of the implied implications of what they may cause (N.T. 126). The witness also suggested that the line, if it was to be built in this corridor, be buried, but admitted that if the line was buried it was not his understanding that there will be no EMF (N.T. 126). After being asked about his contention that the right-of-way for the proposed line was not sufficient, he also admitted he was not an electrical engineer and had not designed an electric transmission line (N.T. 126-127).

On redirect, he testified that his house was worth between $175,000 and $200,000 (N.T. 129).

Margaret E. Lawler of 1533 Grace Circle, Feasterville, Lower Southampton, testified that she lives 1-1/2 miles north up the line from Mr. Koerper. Her property is adjacent to the PECO line; it is 70 feet from the powerline pole to the side edge of her property, and another 20 feet to her house. Her side yard is between the house and the line (N.T. 130).

Mrs. Lawler testified that she has children ages 21, 17 and 13. Her 17-year-old daughter sunbathes and plays with friends in the yard, and her 13-year-old daughter makes general use of it. There is a porch for summer meals, and the family dog is always outdoors (N.T. 131). Her children and other neighborhood children play a variety of street sports in front of

the house in the cul-de-sac. The powerline is approximately 90 feet from the pavement of the cul-de-sac (N.T. 132).

Mrs. Lawler testified that she is aware of the concept of prudent avoidance and has stopped using electric blankets, keeps back from appliances, and keeps family back from television and VCR (N.T. 141). Based on her reading of literature and information obtained through PAUSE, she believes that with respect to EMF risk, prudence avoidance is applicable strategy for her family (N.T. 138-139).

If the line were energized, prudent avoidance would require staying indoors, spending little time outside or in the area, and staying away from the house itself (N.T. 138). Her family will move if the line is energized and, because of the threat, the house is already up for sale. Mrs. Lawler testified that there have been no buyers in 3-1/2 months and that people lose interest in the house when they learn about the line (N.T. 133-134).

On cross-examination, Mrs. Lawler testified that she bought her house nine years ago and that she and her family still use electricity and electrical appliances in their house (N.T. 139-140). She also agreed that it takes transmission lines like the proposed line to bring electricity to her house and it had to be located somewhere (N.T. 140). In terms of prudent avoidance Lawler practiced in her home, she explained that she quit using

her electric blanket two years ago when she became aware of EMF, and she makes sure that she stands away from appliances which are in use (N.T. 142).

On redirect examination, Mrs. Lawler testified that she did not know how to define a safe line in her yard from one side to the other delineating safe from non-safe areas.

George L. Henry of 508 Militia Hill Road, Southampton, testified that he lives two miles east of Koerper. The line is behind his house, 105 feet from the property line and another 60 feet from his home (N.T. 143).

Mr. Henry testified that he has a daughter, age 5. The backyard has a swimming pool, swing set, and workshop/garage in the works. His family spends a lot of time in the backyard, especially in the summer when the pool and swings see a lot of use (N.T. 144). His daughter also spends a lot of time at her friend's house two doors away where the backyard is 36 feet, 6 inches from the line (N.T. 145).

On cross-examination, Mr. Henry testified that he is very scared of EMFs based on television specials he has seen (N.T. 147). He also said that in terms of prudent avoidance he stays away from the microwave oven, plans to replace fluorescent light, and stays back from the television (N.T. 148).

If the line were energized, he would not let his daughter play at her friend's anymore; he would have his yard

tested for EMF. He does not know what he would do if EMF effect were found. All of his money is tied up in the house, and, he testified, "This is like my dream house. With everything in this house and in the backyard, I don't know what I would do" (N.T. 145-146).

On cross-examination, he testified that he had seen "all the television specials on EMFs" and stated that he didn't know it if was prudent or not, but it scared him (N.T. 147). He stated he purchased his house three years ago (N.T. 147).

The witness acknowledged that there were measurable EMFs in his house already -- from the television and microwave-- and that there was a fluorescent light in the bathroom he intended to replace (N.T. 148). He also stated that he planned to stay away from the microwave and television set when it was on (N.T. 148). He also testified if the line were energized, he would have to do additional readings to see how dangerous the amount of EMF would be, but admitted he had no idea what levels of EMF were safe (N.T. 148-149).

Karen Dalrymple of 583 Valley View Road, Langhorne, Middletown Township, testified that she lives towards the eastern end of the line; it is approximately 250-300 feet from the back of her home to the line. It is 150 feet from her property line to the proposed transmission line (N.T. 150-151).

Mrs. Dalrymple testified that her backyard is 206 feet wide and has a swimming pool, and a clubhouse where her son and his friends like to play and sleep out. The pool is near the property line. Besides her 15 year old son, Mrs. Dalrymple lives with her husband and the family dog. The family also has a hammock and enclosed porch in the backyard, and uses the land for croquet and volleyball (N.T. 152-153).

After having read all of the EMF literature she has available, she testified that "you can't help but be afraid." She is a nurse and takes care of cancer patients; her greatest fear is dying of cancer (N.T. 155).

Mrs. Dalrymple stated that she knew that her neighbor had her house up for sale for three months and couldn't sell. Mrs. Dalrymple wants to move, though she's lived in her house for 19 years; her husband does not want to start over, and disagreement has led to conflict (N.T. 154).

On cross-examination and redirect, Mrs. Dalrymple testified that though her house was separated from the line by woods, the line can be seen from her house. She is not assuaged by the fact that the Conrail property is between her property and the line, nor does the PECO literature tell her what distance from the line makes her family okay (N.T. 157-158). She also admitted that trains run along the tracks; that there are two

sets of tracks on the Conrail property; and that the tracks are separated by woods (N.T. 156).

Patricia Kelly Hall of 641 Valley View Road, Langhorne, testified that she lives towards the eastern end of the Woodbourne-Heaton Line, several miles from Koerper and Lawler. Her side yard is closest to the line (N.T. 159-160).

Mrs. Hall testified that she is married and has two daughters, ages 16 and 13, and a boy age 12. Her children play outdoors a lot and in front of Mrs. Dalrymple's house (N.T. 160).

She is aware of the EMF issue and practices prudent avoidance. Mrs. Hall testified that she leaves the room when the microwave is on, won't use electric blankets, and has moved the clocks away from the heads of the beds (N.T. 162).

If the line were energized she would not let her children play down the street or at the Dalrymple's any longer. She would no longer want to swim or visit there either, although Mrs. Dalrymple is her best friend. She would want to have her home measured for EMF before deciding what further to do (N.T. 162-163).

On cross-examination, she testified that she was a member of PAUSE, but did not know if she was a named protestant (N.T. 163). She also testified that she lived in her house five years and that her husband designed and built the house.

Barbara Glathorn of 467 Militia Hill Road, Upper Southampton, testified that she lives 2 miles east of Koerper and has been there for 19 years. It is 400 feet from the end of her property to the Woodbourne-Heaton Line (N.T. 165).

Mrs. Glathorn testified that her husband and 17 year old daughter have used their land for barbecuing, volleyball, sunbathing, croquet and badminton (N.T. 165-166).

Mrs. Glathorn further testified that she has read a lot on EMF and seen television specials on the subject. Her readings have made her concerned enough to want to move. She has serious health concerns owing to history of cancer in her family. She also testified that she is aware that a school has been closed owing to EMF concerns. The school was in Fresno, California (N.T. 166-170).

On cross-examination, she admitted that she had not measured the actual distance between her house and PECO line; she had just judged it to be 400 feet (N.T. 172). She stated that there was a row of houses, a street and the Conrail right-of-way between her house and the line (N.T. 172-173). She also stated she planned to take EMF measurements at her home after the line is energized to determine what steps she might take (N.T. 173). She confirmed that her knowledge about the effects of EMF was from a variety of articles and television reports (N.T. 173). She also confirmed that the line couldn't be seen from her house

and that trees also separated her house from the line (N.T. 173). She also clarified her previous testimony by stating that there was only one home across the street from hers that separated it from the Conrail right-of-way (N.T. 174) but she does not think that the intervening house makes her neighborhood safe (N.T. 172-174).

Robert H. Matirko of 1390 Clover Lane, Feasterville, Southampton Township, testified that he lives 2-1/2 miles east of Koerper, and that the corner of his property is 37 feet from the line itself. The line runs along the back of his yard which is 195 feet long (N.T. 179-180).

Mr. Matirko testified that he has a heavily used patio, a hammock and a swing in the yard. Family functions involving up to 20 or 30 people are held in the backyard (N.T. 181).

With respect to EMF risks, Mr. Matirko testified that he is primarily concerned about his wife's health; she has a low immune system and gets allergy shots regularly. If the line were energized, he would curtail the majority of use of the backyard (N.T. 184-188).

On cross-examination, he admitted he was not a named protestant in this matter (N.T. 186). He testified that the line is 166 feet from the corner of his house (N.T. 186). He also testified that he owned his house for eleven years and that the poles about which he testified were located then where they are

today (N.T. 186). He also testified that freight trains travel on the tracks behind their house (N.T. 186). Matirko admitted that he and his family use electricity and electrical appliances in their house (N.T. 186).

Dante Bontempo of 1381 Clover Lane, Feasterville, Lower Southampton, testified that he lives three miles east of Koerper, across the street from Mr. Matirko. His home is parallel to the line with the front of his house facing the line. It is 300 feet from the line to his property (N.T. 188).

Mr. Bontempo testified further that he uses the outdoor area in the cul-de-sac, approximately 30 feet from the center pole of the line. He has six grandchildren who play there on weekends at soccer, horseshoes and stickball. If the line is energized he does not think that they'll play there anymore (N.T. 189).

Mr. Bontempo also testified that he retired recently with plans to sell his home in a year or year and a half in order to have needed extra income. If the powerline is energized he will not get the needed money due to depreciation (N.T. 189). Unable to create the retirement fund he needs, he would have to change his standard of living. He stated that:

> I would not be able to do the things that I thought I would be able to do in my retirement life: travel, have money for luxury items (N.T. 192).

On cross-examination Mr. Bontempo said that he has lived in his house for 18 years; that the transmission line does not abut his property; that it is across the street from his property and there is an intervening house across the street (N.T. 194). The cul-de-sac playground is located right next to the Conrail right-of-way. There is no fence. His grandchildren who play there visit almost every weekend. In an effort to practice prudent avoidance, Mr. Bontempo has gotten rid of his electric clock and thrown out his microwave oven (N.T. 194-197).

Lynn Cohen of 1509 Grace Circle, Feasterville, next door neighbor of Mrs. Lawler, testified that it is 177 feet from the edge of her house to the powerline with one house in between. It is 147 feet from her property to the line; her side yard is the closest part of property to the line (N.T. 199).

Mrs. Cohen testified that she has a 9 year old daughter and a 4 year old diabetic son. Her son plays a lot in the backyard and in the cul-de-sac which is 55 feet from the line pole. Kids there play baseball, basketball and ride their bikes. Her daughter plays outside as well (N.T. 200).

All of the studies Mrs. Cohen has read link EMF with health risks. She testified that she has read a study which suggests that EMF has adverse effects on insulin production. If the line is energized, she does not think that the neighborhood will be safe (N.T. 201-203).

By way of practicing prudent avoidance, Mrs. Cohen has adjusted the television, stopped using the microwave, kept the children back from television, kept lights out, and gotten rid of appliances like electric can openers. Mrs. Cohen testified of her and her husband that:

> We take all the precautions we possibly can to raise our children as healthy children. We just feel it is unfair that something is being put alongside my home that potentially can harm the children and it is really outside my control (N.T. 203-204).

Mrs. Cohen testified that the house is on the market and that it is written on the highlight sheet that lines are being installed. If the line is energized, the family will leave their house and rent another whether or not theirs is sold (N.T. 204-206).

On cross-examination, she stated that her house was on the market for two and a half months (N.T. 208). In response to questioning, Cohen identified the Jolley study she had earlier referred to as a 1982 study by Jolley, Henshaw and Knierin-Henshaw which was published in Bioelectromagnetics (N.T. 208-209). She also confirmed that her son plays with electric cars but that she believed her husband tested them for milligauss levels (N.T. 209). She also testified that she had lived in the house for a little over eight years (N.T. 209).

On redirect, she testified that she would not expose

her children to magnetic fields when asked what she would do if EMF were to have an effect on insulin production (N.T. 210).

William Cohen of 1509 Grace Circle, husband of Lynn Cohen, testified that Mr. Oedemann from PECO came out to the house and gave estimates on magnetic fields. Mr. Boeggeman said that 360 amperes would be off peak current, 600 would be peak, and 1,000 amperes would be maybe 4 hours per year. Cohen testified that Oedemann's numbers are different: 1,200 amperes would be peak and 1,800 would be maybe 4 hours per year. PECO estimated 3 milligauss at 600 amperes, 5 milligauss at 1,200 amperes, and 8 milligauss at 1,800 amperes -- these were in-house projections (N.T. 212-213).

Mr. Cohen stated that the scientists--epidemiologists, physicists--that he has spoken to have made him fearful. He corroborated his wife's testimony that they will move into a rental house if the line is energized. He also testified that he was hospitalized with ulcers two months prior to testimony never having suffered from them before (N.T. 215-216).

On cross-examination, Mr. Cohen restated that the only electrical appliance they had was a toaster, but admitted that there were electric lights in the home, a refrigerator, central air conditioning and a vacuum cleaner (N.T. 217-218). He stated that they had thrown away a microwave oven and had a gas range (N.T. 217).

Carol Dempsey of 705 Buck Road, Feasterville, testified that she lives 2-1/4 miles east of Koerper. Her property line is 105 feet from the powerline; it is 150 feet from the line to her house itself. There is no house between her and the line; she sees it from her front window; the poles are on the same side of the tracks as her. Her house is elevated and so is actually more even with poles. Her children's bedrooms face the line (N.T. 219-221).

Mrs. Dempsey testified that she has children ages 21, 19 and 14. Her family uses the backyard a lot; they have a terrace; she gardens 8 or 9 hours each week; there is also a patio (N.T. 219-221).

She also stated that with regard to EMF and prudent avoidance, she has read studies and newspaper articles. EMFs and their effects are a great concern to her. If the line were energized, the family will spend as much time as possible away from its home. Her 14-year-old daughter would not be able to play in the yard (N.T. 222-223).

On cross-examination, Mrs. Dempsey stated that she was not 100 percent sure but that she believed she was a named Protestant in this matter (N.T. 225). She explained that a two lane road, Buck Road, which is a state highway, goes in front of her house (N.T. 225). She stated that the trees which had been

cut down were on the right-of-way PECO purchased from Conrail (N.T. 226).

When questioned whether she had had measurements taken, she replied that she hadn't and she wouldn't because there is no proof that a low measurement isn't harmful (N.T. 226). She stated that she thought if there were any detectable level she would stay away from her house because the exposure wouldn't be off and on like an appliance, but would be full-time (N.T. 227).

Frank English, of 239 West Bristol Road, Feasterville, Southampton Township, testified that it is 101 feet from the line pole to the corner of his house. It is 90 feet from the powerline to his property line. The line runs at an angle and his house is set at an angle to the line. It is closest to the northwest corner of his home, in the rear. There is a deck which runs the full length of the back of his home (N.T. 228-230).

Mr. English testified that at the time that he learned about the line construction he had been reading about EMF and became very concerned (N.T. 231). He helped put together the first citizens' meeting about the potential line. The more he learned about EMF the more he felt that he did not want to be associated with it. It made him very "upset" and "angry" because the field is invisible and you can't control it (N.T. 233-234).

Mr. English testified that he and his wife have lived in their home for 12 years and bought it with the understanding

that they did not want to move again. They have spent a lot of money on their home. But the fact is that if there is a possibility of exposure to cancer or biological cell change, he doesn't want to be there; if the line is energized he will abandon the property (N.T. 234).

It was further testified by Mr. English that he and his wife consciously try to practice prudent avoidance. They are careful with microwaves, have changed around televisions and radios, and have eliminated certain electrical items (N.T. 234).

The English's have put the house on the market and potential buyers have explicitly indicated that they are not interested because of the powerline and the proposed energization (N.T. 235).

On cross-examination, Mr. English testified that the trees that he testified that were destroyed were on Conrail property (N.T. 236). He testified that there was a transmission line on the train line when the purchased the house in 1979, but he understood from the neighbors that the line had not been energized for ten years (N.T. 237). He stated that he did not confirm this information with Amtrak or Conrail (N.T. 237).

Mr. English also clarified his testimony about the relationship of his property to the PECO line (N.T. 237-238). He explained that the house sits at an angle to the line and across the front of their property it adjoins the Conrail line (N.T.

237). He further explained that the back of his house, his property line is 10 feet from his house and about 91 feet from the PECO poles on the Conrail line (N.T. 238).

He further explained that three months prior to finding out about the line, his house was listed with a friend in the real estate business for a test market (N.T. 238). When he found out about the line, Mr. English stated he told the friend to put it on the market and to get rid of it (N.T. 238). Mr. English also testified that three people lived in his house: he, his wife and his mother-in-law (N.T. 239).

Dorothy English of 239 West Bristol Road, Feasterville, corroborated her husband Frank English's testimony.

Mrs. English testified that when the line issue arose, she began to make calls about EMF and got many papers and articles. She was bothered by how old some of the research was and how long the EMF issues had been around. If EMF can affect cells, she doesn't want to be near it. She understood from PECO that milligauss levels would be 100 at the edge of the right-of-way, and 30 at the edge of her home. Her research tells her that 2-1/2 to 5 milligauss would be safe. It is her understanding that EMFs accelerate rate of cell division and even cause alteration to the structure of the cells (N.T. 242-243).

Mrs. English further testified that there are enough questions about EMF that "it is not reasonable to ask people to

be subjected . . . and essentially be human guinea pigs until the research is settled" (N.T. 243). For her and her husband's part, they have practiced prudent avoidance by measuring appliances, rearranging rooms, and reducing appliance use (N.T. 243-244).

If the line is energized the Englishes will leave. They have reduced the price of their house $60-70,000 in an attempt to sell, but people say the line is too close (N.T. 245).

Mrs. English testified that she is a co-founder of PAUSE. PECO and non-PECO people came to talk to citizens about EMFs and Mr. Stan Johnson of PECO downplayed EMF danger and cited the statistical insignificance of two more child cancer victims out of 10,000 which made Mrs. English very angry (N.T. 246-247). She also testified that Mr. Johnson said EMF was a social issue, that society had to decide what to do about it. Mrs. English testified:

> Well, if the onus is on society to decide what to do about it why don't we have say in whether this line is put up or not? None of us were notified. The township didn't recall being notified (N.T. 247).

On cross-examination, Mrs. English testified that she tested outside her home for EMF and the level was 0 milligauss. Indoors has been tested and the levels tend to be significantly below 1 milligauss (N.T. 248).

Of the English's indoor appliances, only the refrigerator is on 24 hours per day, seven days per week, and its

emissions don't compare to the proposed line according to what PECO said, Mrs. English testified (N.T. 249).

William J. Harley of 1660 Bonnie Brae Drive, Huntingdon Valley, Upper Southampton Township, testified that the rear of his home is 206 feet from the proposed line. At the rear of his home is the dining room and the office where he sometimes spends 10 hours per day working. The line is 60 feet from his property line. The rear of the house, 270 feet, runs parallel to the line (N.T. 250-251).

Mr. Harley also testified that he has two grown children who live with him, as well as his wife. The backyard is used for picnics, friends, son's lab, deck, basketball (N.T. 252).

Mr. Harley stated that he has read up on EMFs and seen programs on television. He is scared about his family's exposure to EMFs given the history of cancer in his family and his wife's family.

Mr. Harley testified that he only moved in 15 months ago. Now he cannot sell his house. A realtor told him that he would only get 25 percent of what he paid because of the proposed line. After adding in other expenses, he calculates that he just cannot afford to move. The alternative to taking a loss on the sale of his home is to walk away, but he feels that he is locked

in. The property seemed to him to be where he wanted to retire (N.T. 253-254).

On cross-examination, he stated he believed that he was a named Protestant in this matter (N.T. 256). He also affirmed that he uses a personal computer as part of his work (N.T. 256). Harley also admitted that he smokes cigarettes but not in the house because he doesn't want to expose his family to cigarette smoke (N.T. 256).

Virginia Lynn Monarch of 17 Wychwood Lane, Langhorne, testified that the line goes along the back of her property line, about 50 feet back. It is about 170 feet from her home to the line (N.T. 258).

Mrs. Monarch has a husband, a six year old daughter and an eleven year old son. Her bedroom and her son's are at the rear of the house. The children play in the yard; there is a swing set, sandbox, picnic table, clothesline and basketball court (N.T. 259).

Mrs. Monarch testified that she has read about EMF risks in regard to leukemia, cancer, melatonin. Her son already has attention deficit syndrome and she fears he is going to get much worse because of EMF (N.T. 260).

She testified that if the line were energized she would move. She further stated:

> We moved to this house and we thought it was our final house, you know, that we would live

there forever. So it is a major disruption of our plans. Our children are very well settled in their schools and all that. I don't know how to balance it, but financially it would be devastating (N.T. 261).

On cross-examination, the witness testified that she believes that her property abuts Conrail's property line although she admitted that she didn't know where her property ended (N.T. 262). She testified she lived in her house four years and when she bought the house, she knew that there was a freight line and a defunct electric line (N.T. 263).

Alix Shirley Maier, of 1331 Clover Lane, Feasterville, testified that she lives on the same block as Witnesses Bontempo and Matirko. She lives across from the transmission line, facing it (N.T. 263).

Mrs. Maier testified that she has a daughter, 11-1/2, and a son, aged 9. She and her children walk around the neighborhood a lot, and the kids play in the fenced-in backyard. Her children are home more than other children, and in addition, they play in their neighbors' backyards (N.T. 265-266).

Mrs. Maier further testified that when she was younger she lived near power lines. Out of the 9 closest houses to the lines, there were 4 cases of cancer including her. Mrs. Maier had uterine cancer which required years of extensive treatment (N.T. 265).

If the line were energized, Mrs. Maier testified that she would not want her family to remain in the house. She said that, financially, her family could not afford to move, but she would find someplace to go (N.T. 267).

On cross-examination, Mrs. Maier testified that she was not good at judging distance but stated that she was about as far away from the line as Mr. Bontempo's house (N.T. 268). She also testified that they moved in in June 1978 and lived there for 13 years (N.T. 268).

Robert Small, of 15 Wychwood Lane, Langhorne, testified that he lives two doors from Mrs. Monarch. The back of his property is 200 feet long and runs parallel to the train tracks. It is 45-50 feet from his property line to the center of the Conrail right-of-way (N.T. 269-270). Depending on which corner of the house chosen, the power line is 110 or 130 feet from his home (N.T. 275).

Mr. Small testified that he has a son, aged 5, and a daughter, aged 2. The back area of Mr. Small's backyard has a jungle gym; there is a deck which runs along the back of his house. Mr. Small's daughter's bedroom is in the rear of the house. His children spend a lot of time playing in the backyard (N.T. 275-276).

If the Line were energized, Mr. Small stated:

> I am going to be in a situation where I can't run the statistical probability of even an

> hour a day being too much exposure for them [his children]. I don't want to be talking to them 15 years down the road and saying the reason why you have a health problem is because I underestimated the dosage. I should have only allowed you to play 45 minutes in the backyard, not an hour and 15 minutes . . . So basically it has turned my backyard into a wasteland (N.T. 277).

As to prudent avoidance, Mr. Small testified:

> They're [PECO] going to put something that's going to blast my property 24 hours a day, 365 days a year. That is being put to me. There is no way I can exercise prudent avoidance on something that is being put to me in such a constant fixed fashion (N.T. 278).

If the line were energized, Mr. Small will have to move his children out of the risk environment; he will move. The move will cause him to lose $30-50,000 just in out-of-pocket expenses alone. He estimates that between $25-40,000 of improvements have been done over the years that he will have to walk away from (N.T. 279-280).

On cross-examination, he denied that PECO had removed other trees from his property at his or his wife's request (N.T. 282). He also denied that PECO removed a tree in front of his home, on the other side of his home from the line (N.T. 283). He then clarified the sequence of events: PECO cutting down 10 or 12 trees without his being aware of what was going; a supervisor proposing to him that that work crew take down two or three dead trees in his backyard instead of fighting about monetary

compensation which could go through the court system; and he told the supervisor he'd think about it (N.T. 283). He testified that the next thing he knew, they came in and took down the trees (N.T. 283). He stated he never agreed that cutting down the trees would be compensation for his trees (N.T. 284). He further stated that the wood was not cut into fireplace sized pieces (N.T. 284).

On being shown a document which read that "the following work is promised with the approval of Robert and Jill Small, 15 Wychwood Lane, Langhorne, PA," Mr. Small admitted that it was his wife's signature on the document, but he claimed never to have seen it before (N.T. 284). He further stated that he could verify his wife's signature, but he didn't know what went on the paper first (N.T. 286).

On redirect, he testified that he was never approached by a PECO real estate acquisition agent (N.T. 287). He also confirmed that he had never authorized his wife to act as his agent in respect to the agreement with PECO (N.T. 287).

Joseph Bianchimano, of 91 Bridgestone Drive, Langhorne, testified that it is 50 feet from his property line to the PECO transmission line. It is 75 feet from the line to his house (N.T. 437-438).

Mr. Bianchimano testified that he has a wife and children aged six and 12 months. His children play out in the

street along which the line runs adjacent; all the neighborhood kids play there. He testified, as president of the homeowners association, that there had been plans to build a playground at an open area on the block (N.T. 438; 447-448).

Mr. Bianchimano testified that he has read EMF literature and feels he cannot take a chance with his children given the cancer risk. Having read Swedish studies, EPA reports, NPR announcements, and about seminars in Washington, D.C., he believes that the preponderance of evidence indicates an EMF risk to health. As a "reasonable parent", he cannot subject his children to the risk (N.T. 440-441). His wife's family has a history of cancer, and she herself had a cancer operation in May 1991.

It was further testified by Mr. Bianchimano that his family tries to practice prudent avoidance. Family members stand away from the microwave and television; his son was moved out of the room under the attic which has an electric heating unit; they use no electric blankets and have moved clocks. He testified that there is nothing he can do to avoid EMF risk from line owing to its closeness; he cannot avoid a transmission line over which he has no control (N.T. 445-447).

Mr. Bianchimano testified that if the line were energized, he would not use the play area outside for the children because of his EMF concerns. If the line were

energized, in fact, the homeowners association would not build a playground as planned. If Mr. Bianchimano were to stay despite energization, he would drive his children to a safe place to play; but that it is a moot point because he will leave his home if energization takes place (N.T. 450-452).

Mr. Bianchimano is a real estate agent. He testified that he has been unable to sell his house (N.T. 439). As a realtor, he has a moral problem selling property near lines or substations. He would communicate concern about the line and energization thereof to any prospective buyer of his home. People have questions as to why three houses on his block are for sale; one neighbor just left with three children and turned his house over to the bank (N.T. 442-444). He knows from the Multiple Listing Service -- and in his capacity as president of the homeowners association -- that the other houses on his block were not for sale prior to the date of notice of PECO's intent to energize the Woodbourne-Heaton Line (N.T. 455).

Mr. Bianchimano testified that he would remain in his home were it not for the line. His child is currently in a special education program in the Council Rock School District, but he would have to move to another area (N.T. 459). As for the house, he paid $300,000 for it and has done an estimated $35,000 in improvements, including $12,000 in landscaping alone. His

family has plans and desires to further improve the house (N.T. 457, 460). Mr. Bianchimano stated:

> This is my dream house. This is what I have worked 40 years for. This is what I have always wanted. And now that I have it, it's dashed away by a powerline that I have absolutely no control over.

On cross-examination, Mr. Bianchimano verified that a freight line travels in front of his house, but testified that the train schedule is erratic that sometimes you will get one or two or five trains a week (N.T. 462). He then testified that his property is across the street from the railroad tracks and clarified that his house sits back 75 feet from the edge of the property which faces the power line (N.T. 462). He confirmed that his house does not abut the Conrail right-of-way and that there is a parcel of land, a strip and then the power line (N.T. 462). He also confirmed the fact that his house is an all-electric home with a heat pump (N.T. 462). When asked whether he was a named protestant in this matter, he stated that he was not sure, but that he had been with PAUSE since the beginning, had acted as a liaison between PAUSE and Northampton Township and participated in PAUSE fundraising activities (N.T. 463-464).

The witness again attempted to clarify his statement about the power line's distance from his house by stating that he would say that it was a total of 125 feet from his door to the power line (N.T. 464). He admitted that he measured the distance

from his property line to the power line, but had not measured the width of the street or the intervening parcel of land (N.T. 464).

John Fox, of 17 Wychwood Lane, Langhorne, testified that one corner of his property line is 60-70 feet from the Woodbourne-Heaton Line. His property is approximately .8 acres. His home is approximately 170 to 190 feet from the line (N.T. 466-467).

Mr. Fox testified that he has a wife, a 10 year old son, and a six year old girl. The childrens' rooms are closest to the powerline. His children play throughout the neighborhood, including the wooded area of the yard that runs by the line (N.T. 468-469).

Mr. Fox averred that he is nervous and upset about the health risk produced by the line. He has learned about the increased incidence of cancer, leukemia in children, brain cancer, and other risks linked to EMFs. He has learned of the definite connection between EMFs and human cell operation (N.T. 470-471).

EMF reports have changed the way Mr. Fox's family approaches electricity in their home. Clocks have been moved, microwave use has been reduced, and a terminal shield is used by Mr. Fox when he works at his computer (N.T. 471; 473).

If the line were energized, Mr. Fox testified that he would move. A man who was interested in buying his house decided not to because of EMF risk (N.T. 469). He paid $210,000 for his house and has added an estimated $30,000 more in investments. If he could not sell the house in a couple of years, Mr. Fox would have to consider abandoning it (N.T. 472-473).

Joseph Kelly, of 3904 Warfield Drive, Huntingdon Valley, testified that his business address is 206 Holland Road, Holland. His business, real estate sales and management, employs 6 people full-time. It is 500 feet from the line. His business has been at its present location for 7 years (N.T. 474-475).

The intention to energize the line, Mr. Kelly testified, has led to an awareness of EMF health issues; employees now stay three to four feet back from computer terminals. He is concerned about his health and his employees have voiced health concerns as well (N.T. 476-477).

If the line were energized, he would strongly consider relocating his business though it is presently in a prime business location and he is known to be there (N.T. 476).

In selling houses, Mr. Kelly testified, he would feel obligated to tell buyers about the line. He is aware that other properties abutting the line have been on the market for six to nine months, and one has even been on the market for a year and a half (N.T. 478-479).

On cross-examination, Mr. Kelly testified that he knows of other houses away from the line that have been on the market 6 to 9 months but that 1-1/2 years is rare (N.T. 480). Mr. Kelly spends 10 to 12 hours per day in the office; his employees are real estate agents and they spend half of the time he spends there (N.T. 481).

Michael Lawler, of 1513 Grace Circle, Feasterville, testified that the power line is 70 feet from his property line. It is 90 feet from his house to the power line (N.T. 481-482).

Mr. Lawler further testified that he has a wife and children, ages 21, 17 and 13. His children play ball in the yard parallel to the line and in the cul-de-sac out front with the rest of the neighborhood children (N.T. 482; 484-485).

Mr. Lawler testified that he and his wife have been very scared about EMFs since learning about them from television and magazine articles. By way of prudent avoidance of EMFs, they have stopped using electric blankets, they have forbidden the children to use the microwave, and he and his wife stand back from the microwave and the electric stove (N.T. 483-484).

The Lawlers' house had been for sale for three months at the time of the hearings; they put it on sale because of fear of EMFs. The Lawlers paid $80,000 for the house and have put in an additional $4,000 in improvements. No one has made an offer on the house (N.T. 483-484).

If the line were to be energized, Mr. Lawler testified, he would not let his kids play in the yard or the cul-de-sac anymore. He will also be "scared to death" if energization occurs, and financially hurt. He will have to drive his children to another location to play. His wife is very upset about having to move as she loves the house and neighborhood (N.T. 485-486).

Elaine Kupcinski, of 1508 Grace Circle, Feasterville, testified that it is 70 feet from her property line to the proposed power line. It is 90 feet from the line to her home (N.T. 487-488).

Mrs. Kupcinski testified that she is married with three daughters aged 12 and 14. Her kids play in the backyard, parallel to the line, and in the cul-de-sac across the street like the Lawler children (N.T. 488-489).

She further testified that she has read EMF literature through PAUSE and seen it in the media (N.T. 494). Her kids are scared of EMFs and say they don't want to stay; they don't want cancer, leukemia or tumors (N.T. 493).

Mrs. Kupcinski has practiced prudent avoidance. She has moved the family's clock and leaves the room when the microwave or dishwasher are in use (N.T. 489).

If the line were energized, Mrs. Kupcinski testified, she would no longer allow her children to play in the yard and cul-de-sac. In fact, she would move, as she feels that she would

be "writing" her "children's death warrant" if she stayed. Both her and her husband's families have cancer histories (N.T. 489-490).

Mrs. Kupcinski testified that the family has a $60,000 mortgage and has put in approximately $10,000 worth of improvements. She would move whether or not the house could be sold. The house has not yet been put up for sale as she recognizes the problem of several houses on the block being for sale concurrently and has held off accordingly (N.T. 491). She sees no options to avoid the EMF risk but to move (N.T. 496).

Dr. Abraham R. Liboff testified, inter alia, that he is Professor of Physics and Director of the Medical Physics Doctoral program at Oakland University in Rochester, Michigan; that he has been involved in biophysics and medical physics research since 1968, focusing in three areas: the physical properties of biological materials, the experimental effects of electric and magnetic stimulation on living systems, and the mechanisms underlying the interaction of weak magnetic fields and living systems; that he organized the first conference ever held to specifically examine the evidence for bioelectromagnetic interactions; that he is currently a reviewer for the key journal in the area of bioelectromagnetism, Bioelectromagnetics, and an Associate Editor for the Journal of Bioelectricity (Protestants' Statement No. 2 [Liboff] at 1).

He further testified that it was known back in the 1960's that weak electrical currents can influence repair mechanisms in hard and soft tissues. Electromagnetic procedures have become "recognized clinical techniques for treating certain types of bone problems" (Protestants' Statement No. 2 [Liboff] at 1). Cells must have a specialized mechanism to detect weak electrical signals, but a physical explanation has yet to be found (Protestants' Statement No. 2 [Liboff] at 3). A weak electric or magnetic field is one so small that there is no good physical reason to suppose any sort of physical interaction with living systems; magnetic fields associated with power lines fit into this weak category (Protestants' Statement No. 2 [Liboff] at 3).

Dr. Liboff's research 11 years ago found that cells exposed to weak extremely low frequency (ELF) show changes - they consistently exhibit an increase in DNA synthesis. Marron et al showed that protein synthesis can be affected; Bawin et al found that calcium efflux from brain tissue can be enhanced; and upwards of 100 other reports of this nature have been published in scientific journals (Protestants' Statement No. 2 [Liboff] at 2).

In Dr. Liboff's opinion, the "basic unlikelihood of these phenomena" goes a great distance towards explaining why the epidemiological work of people like Nancy Wertheimer and the

Savitz study were vigorously attacked. Every such study, and Dr. Liboff avers that "there is a preponderance of positive studies," has been severely criticized in ways suggesting that if the likelihood of interaction were more reasonable, the results of such studies would be more reasonable. He further testified that

> There has resulted a sort of hysterical, non-scientific evaluation of this epidemiological data, in which critics spend a lot of energy searching out minute disparities between study A and study B, giving uncritical emphasis to a very few earlier negative studies, arguing interminably about 'cause and effect,' (a non sequitur in that epidemiology never establishes causal relationships) and searching for confounding factors or hidden variables to explain away these unpleasant correlations--all because it's not easy to show weak magnetic fields can interact with tissue. Healthy skepticism is of course an important requisite for doing good science, but it is equally important not to let preconceived notions blur your observations (Protestants' Statement No. 2 [Liboff] at 3).

Dr. Liboff went on to testify that were it not for the political sensitivity of the epidemiologists' EMF findings, the basic correlations would have been accepted years ago. As an analogy, Dr. Liboff referred to data dealing with tobacco smoking and lung cancer which was long resisted (Protestants' Statement No. 2 [Liboff] at 3).

Dr. Liboff further testified that the epidemiological results linking human cancer to line exposures becomes much stronger when placed in the context of a larger body of work

sharing the common characteristic of ELF-induced biologic change. Three lines of independent evidence are connected: bone repair studies, altered cell responses, and epidemiological cancer studies. Each area involves a different type of biological response to weak low-frequency magnetic fields. If one appreciates the strength of experimental evidence in the first two categories, one should then be willing to accept at face value the epidemiological work in the third category (Protestant's Statement No. 2 [Liboff] at 4).

Dr. Liboff also stated that a variety of physiological processes are sensitive to weak ELF magnetic fields and one of these "pathways" apparently leads to human cancer. There are also concerns regarding human reproduction -- the work done by Wertheimer is an example. Work done by Wilson indicates that there are endocrine changes connected to the pineal gland following EMF exposure (Protestants' Statement No. 2 [Liboff] at 4). Graham and Cohen have reported evidence of changes in heartbeat in a group of men exposed to 60 Mz magnetic fields. Reiter has studied magnetic field induced changes in melatonin and linked them to some sleep disorders, for example. Dr. Liboff's extensive research and his awareness of research done by others has led him to believe that magnetic fields present a hazard to human health. This opinion is based upon the gradual acceptance of epidemiological data, with each new report

strengthening prior ones (Protestants' Statement No. 2 [Liboff] at 5).

Dr. Liboff testified that he has put forward a hypothesis as to the mechanism that would explain at least the physical part of the ELF interaction related to EMFs. The concept is called Ion Cyclotron Resonance (ICR). The hypothesis holds that the effects observed as a result of exposure to 60 Mz magnetic fields are functionally dependent upon local dc magnetic fields. He testified that "specific combinations of ac and dc magnetic fields can act to put different biological ions such as calcium, potassium and magnesium into resonant states and thereby influence their transport into and out of the cell" (Protestants' Statement No. 2 [Liboff] at 5). Dr. Liboff and his team have carried out dozens of experiments designed around the ICR hypothesis and most of them have been successful and confirmatory of ICR. They have obtained a number of patents involving both the basic ICR concept and a number of medical applications (Protestants' Statement No. 2 [Liboff] at 5).

Another area Dr. Liboff notes in connection with ICR, involves his work on exposing human lymphocytes to calcium-tuned magnetic fields which resulted in "profound changes in calcium uptake." This approach has been carried on and expanded by others. Also, he has begun in the last year a new series of experiments to examine the effects of weak ELF resonance

exposures on human cancer cell lines, notably human lymphoma. Others in this area confirmed results of "high rates of proliferation in ELF magnetic fields" (Protestants' Statement No. 2 [Liboff] at 6). Dr. Liboff testified that he is now reasonably certain that human cancer cells, at least in vitro, show "significant progression following exposure to weak 60 Mz magnetic fields at specific geomagnetic resonance values " (Protestants' Statement No. 2 [Liboff] at 6).

On cross-examination, Dr. Liboff confirmed that he had a master's degree and a Ph.D. in physics, and not in a subspecialty such as biophysics or atmospheric physics (N.T. 755). He also confirmed that he had not taken any courses beyond the undergraduate level in immunology, teratology, molecular genetics, cellular biology, pathology, epidemiology and oncology (N.T. 755-756). He testified that he sat in on a course in biochemistry but did not formally take it, and that he took courses in biophysics which is a subject he also teaches (N.T. 755, 756). He also stated that Oakland University does not have a medical school and he is not a medical doctor (N.T. 756-757).

Dr. Liboff verified that he is familiar with the scientific concept of replication and explained the concept as follows: that the mere replication of an experiment from one laboratory to the next does not necessarily fulfill the demands of what scientific replication are about (N.T. 760). He further

explained that scientific replication in a larger sense has to do with a large picture and not a specific experiment (N.T. 760). He explained that the problem with a specific experiment is that it is impossible for one laboratory to replicate another experiment in terms of all necessary experimental parameters in the protocol (N.T. 761). He then added that you would have to go down to the time of day and temperature and the people walking down the street and a hundred and one parameters that no one knows when they do an experiment whether they are important or not (N.T. 761).

Dr. Liboff agreed that to truly replicate something, you would need to have all the conditions the same (N.T. 762). On whether the use of the word "replicate" is applicable to experiments which only repeat an experiment as closely as possible, but not all the conditions, Dr. Liboff stated that it was almost a matter of advocacy instead of truth (N.T. 763).

When questioned about whether he knew of an example where one got the same results from follow-up experiments which did not duplicate the exact conditions of the original experiment, Dr. Liboff cited a calcium efflux experiment which had been initiated by a group of researchers in Dr. Adey's laboratory in California in 1973 or 1974 which involved the loss of calcium from sliced brain tissue (N.T. 764). In the experiment, an <u>efflux</u> of calcium was observed as a result of

applying a specific field (N.T. 764). When the experiment was done by another group of researchers, it resulted in an influx of calcium (N.T. 764). Dr. Liboff explained that researchers on different sides of the issue took the influx of calcium as opposed to the efflux of calcium to argue against the believability of the first experiment (N.T. 764). Dr. Liboff counted himself among those who believed that if both experiments were carefully done then one conclusion that could be drawn is that there are some changes in calcium which could be manifested as either an influx or an efflux (N.T. 764-765). Dr. Liboff then agreed that when there is more than two or three experiments on a particular subject, then it is more likely that more is known about the subject and the association and added that that was the way science moves, i.e., that you need a body of work to make decisions (N.T. 768).

Dr. Liboff then agreed that the transmission line will create 60HZ sinusoidal fields rather than pulsed fields when operated properly (N.T. 769). He also agreed that sinusoidal and pulsed fields have different characteristics and that one difference is that pulsed fields contain many frequencies or a spectrum of frequencies higher than 60HZ (N.T. 769-770).

Dr. Liboff agreed that there was a difference between showing a biological effect and a health hazard and stated that there are all sorts of biological effects that under simple

conditions need not be hazardous (N.T. 778). He offered examples: (1) sugar placed on the tongue is not hazardous if you are young enough, not overweight or diabetic, and (2) the measured physiological changes that result in the change in the physical background from going from an air conditioned room out into the sun (N.T. 778). He then expressed the opinion that the term "hazardous" reflects a situation where there is some measured level of illness, or in extreme cases death that might result in a correlative way with a specific parameter (N.T. 779). He explained it would be hazardous for some people to place sugar on the tongue and for some people to undergo a severe change in temperature (N.T. 779).

On the subject of epidemiology, Dr. Liboff agreed that the field could be described as the study of the patterns of disease in population and added that it could be used for things other than disease (N.T. 779). He also agreed that he didn't know a mechanism by which EMF creates biological effects, but he set forth a hypothesis for that mechanism (N.T. 780).

When asked about whether it was accurate that no one has identified an established, not hypothetical, mechanism for the interaction, Dr. Liboff stated he had a mechanism and many people are basically in agreement with his mechanism or hypothesis (N.T. 782). He then agreed that his ion cyclotron resonance idea was a hypothesis as distinguished from a theory

and that the basic path that is followed is from hypothesis to theory and beyond (N.T. 783).

Dr. Liboff agreed it would be fair to say that a hypothesis is an idea around which you design experiments to test whether that hypothesis is correct or not, but he stated that it need not be an experiment and that hypotheses are theoretical (N.T. 784). He stated that the hypothesis under scrutiny in this case has both experimental and theoretical ramifications that might not lend themselves to laboratory experimentation (N.T. 784).

Dr. Liboff also confirmed that he conducted a number of experiments on his ion cyclotron resonance (ICR) hypothesis including experiments on rats (N.T. 785). He testified that he believed he had said in his deposition that the rat study was not a published experiment, but the report leaked out and someone attempted to replicate the experiment and failed (N.T. 786).

Dr. Liboff also testified that he was part of a larger group that was working with diatoms, a single celled microscopic organism found in fresh and seawater bodies of water (N.T. 787). He explained they are the equivalent of plankton, which whales eat by droves (N.T. 788).

Dr. Liboff also stated that the researchers at the University of Rochester were attempting to repeat his work on diatoms but he was not sure that they had completed or published

the work (N.T. 788). He did hear that they were not able to repeat the same results (N.T. 788).

Dr. Liboff also verified that Dr. Parkinson at the University of Michigan attempted to repeat the diatom experiments but was not able to achieve the same basic results (N.T. 789). He explained that there are some questions as to whether or not the experiments were done under the same conditions specifically as to the source of the diatoms and how they were handled (N.T. 789).

Dr. Liboff then confirmed that he did work with human lymphocytes and that there had been attempts to replicate this work (N.T. 790). He acknowledged that one group in London, England attempted the experiments and did not get the same basic results (N.T. 790). He also confirmed that a group in London, Ontario also attempted to replicate the lymphocyte work and could not (N.T. 790-791). Dr. Liboff also testified that giving them the benefit of the doubt about their ability to design proper exposure coils, a group at Berkeley managed to replicate his work on cyclotron resonance (N.T. 792).

Dr. Liboff confirmed that Dr. Walleczek was one of the group of researchers who replicated his work with human lymphocytes (N.T. 792). Dr. Liboff also confirmed that Walleczek's group added another variable to the original Liboff experiment -- the use of mitogenic stimulation of the lymphocytes

(N.T. 792). He explained they added the mitogen ConA, and when they did that, they obtained very consistent results (N.T. 792-793). Dr. Liboff then testified that the two laboratories have resolved the difference in experimental design because of the likelihood that Dr. Liboff used a larger density of cells, such that the cells were self-stimulating by virtue of cell contact, which would have been equivalent to adding an external mitogen (N.T. 793).

Dr. Liboff also confirmed that he did research on embryonic chicks and he stated that he wasn't aware of any attempt to repeat those results under cyclotron resonance conditions (N.T. 796). When asked whether his research with rabbits had been replicated, Dr. Liboff said that those experiments had been done as part of an entrepreneurial situation where the patents for ion cyclotron resonance were licensed to a company who was working to develop a device for repairing bone (N.T. 796). He explained that the research on rabbits was not published, but it was his understanding that the experiments had been done in a number of institutions (N.T. 796-797).

Dr. Liboff also confirmed that other researchers have not published any results of any studies dealing with an attempt to repeat his work in the ion cyclotron resonance area (N.T. 799).

Referring to work done by Reva Goodman which he had mentioned in his direct testimony, Dr. Liboff confirmed that the research was done on protein synthesis and on RNA stimulation (N.T. 799). Dr. Liboff verified that he was not an expert in the type of work that Dr. Goodman did (N.T. 800). He then stated that to the best of his knowledge, her work had not been replicated in any other lab (N.T. 800). He also stated that although Goodman's work had not been replicated, she has seen consistent results over the years (N.T. 801).

The cross examination turned to the experiment involving calcium efflux done by Bawin, Kazmarek and Adey, which was published in 1974 (N.T. 801). Dr. Liboff explained that in this experiment, a chick brain was profused with calcium 45 so as to have calcium move into the brain tissue and then the brain was sliced and the slices divided into control and experimental groups (N.T. 802). Dr. Liboff explained that the slices in the experimental group were exposed to whatever field they were using, and the controls were not (N.T. 802). Comparisons were made as to how much radioactive calcium leaked into the environment (N.T. 802).

Dr. Liboff confirmed that Dr. Carl Blackman tried to reproduce the experiment and did it for nine or ten years (N.T. 802). He also confirmed the fact that the Rochester group tried this experiment too and admitted that at one point Dr. Morton

Miller convinced him there was a technique in the way the brain was being sliced so that there was something different between the controls and experimentals (N.T. 803). He spoke to Blackman about this observation, but Blackman said that they randomized the way they took brain slices (N.T. 804). He stated that this led him to think that the Rochester group has less than a total grasp of what was going on (N.T. 804). He added that their lack of replication of this experiment as well as the studies with lymphocytes and diatoms (referred to earlier) reflects a way of doing science that is not the way he does it (N.T. 804). Dr. Liboff testified that he would not extrapolate the calcium efflux studies to humans (N.T. 805).

Dr. Liboff then confirmed he had referenced experimental research he had done on DNA synthesis in this report (N.T. 805). He stated that the results of his study had been replicated by Takahashi and were published in "Experentio" (phoenetic from transcript) (N.T. 805). Dr. Liboff stated that the fields he used in his experiment were very high -- the lowest being a few hundred milligauss and the highest being 16 Gauss (N.T. 806). He also explained that the frequencies he used were 15 Hertz to 4,000 hertz, and the fields were almost 90% sinusoidal (N.T. 806). He added that they did do some experiments involving pulsed signals (N.T. 806). Dr. Liboff confirmed that the Takahashi paper used pulsed fields (N.T. 807).

Referring to the epidemiological study of Nancy Wertheimer on reproductive effects and electric blankets cited at page four of his direct testimony, Dr. Liboff confirmed that the study was important because it, along with her previous 1979 study dealing with leukemia, initiated two separate epidemiological areas that are now being investigated (N.T. 818). Dr. Liboff stated that Wertheimer has a Ph.D. in psychology (N.T. 818).

Dr. Liboff verified that he had, in his direct testimony, indicated that there was evidence indicating changes in chick eggs and fish eggs (N.T. 826). He identified the work on chick eggs as that being done by the Madrid group including Delgaito and Veda and Jocelyn Leal, and by a navy group called Project Hen House (N.T. 826). He testified that the Madrid group used mainly pulsed fields which produced some results (N.T. 826-827). Dr. Liboff then testified that Project Hen House represented an attempt to verify the work observed in Leal's laboratory (N.T. 827). He testified that they also used pulsed fields (N.T. 827).

Dr. Liboff testified that he had written a statement that "biological systems contain receptors or sensors designed to recognize these small signals," but explained that it's an implied statement that does not necessarily mean that anybody has ever observed sensors or receptors that are capable of detecting

a magnetic field (N.T. 843). He also explained that it's just an explanation as to how magnetic fields could interact with biological systems and that they have been identified (N.T. 843).

Dr. Liboff testified that more research needed to be conducted on EMF but that the primary source of funding for this research should not be the Department of Energy, which Dr. Liboff believes would succumb too easily to political pressure (N.T. 846). Dr. Liboff also stated that he didn't think that the Department of Defense should be in charge of research funding in this area because he didn't think the Office of Naval Research is a very liberal group when it comes to supporting research in a way that doesn't provide constraints (N.T. 850). He offered the opinion that work should be housed in the National Institutes of Health or the National Science Foundation (N.T. 850). He also did not think EPA should be in charge of funding because they do most of their research in-house so that none of their people or scientists can come to a hearing like this to testify (N.T. 851). Dr. Liboff also indicated that he had this feeling that the amount of information on the subject is being filtered by the process which prevents information from coming to groups (N.T. 851).

Dr. Liboff then testified that the NIH should be doing the bulk of the funding (N.T. 857). He stated that the NSF is a little more difficult to involve in a logical way because they

wouldn't fund epidemiological research because it's too clinical (N.T. 858). The NIH does epidemiological research (N.T. 859).

Dr. Liboff also testified that his opinion about hysterical and non-scientific evaluation does not refer to individuals in the epidemiological area who are making these reviews, but to individuals who are not epidemiologists making these reviews (N.T. 862). He further explained that he was referring to people like Professor Adair at Yale, holder of the prestigious Sterling Chair in Physics, who said that these studies were wrong because there is no explanation for them (N.T. 862-863). He called this evaluation non-scientific of an epidemiological report (N.T. 863, 864). He stated that a scientist must have an open mind (N.T. 867). Dr. Liboff affirmed that this same non-scientific approach can occur when somebody would look at epidemiological data and conclude that there must be something going on here and stated that it cuts both ways (N.T. 868).

Dr. Liboff confirmed that in his direct testimony he did say there may be specific values of the earth's magnetic field for which 60HZ exposure will be particularly hazardous (N.T. 877). He added that his opinion was based on two things: 1) his ion cyclotron resonance theory, and 2) recent experiments that are in the abstract process (N.T. 878). He stated that when these 60HZ fields are in combination with local DC fields, "we"

can predict that there will be biological effects for certain values of the earth's magnetic field (N.T. 879). He then stated that "we" do not have a good handle on the role of the intensity of the 60HZ field, and that the role of intensity is not included in his ion cyclotron resonance predictions (N.T. 879). He also stated that the peak value of the AC intensity as measured in milligauss is another parameter that has to be taken into account in assessing a potential hazard (N.T. 879). He believed what was logical to suggest was to try to minimize the intensity of AC fields (N.T. 879). This, he said, was independent of the argument between frequency and the DC or geomagnetic field (N.T. 879).

Dr. Liboff clarified his testimony stating that he thought that there are biological effects that occur at certain combinations of frequency, in this case 60HZ, and the local geomagnetic field (N.T. 880). He also stated that whatever biological effect that one will find which possibly could go to a hazardous condition would be found under these combinations of frequency and magnetic field (N.T. 880). He testified that he did not study whether those earth magnetic field values exist in the area along this line (N.T. 880). Dr. Liboff testified that he did not have the data for the magnetic fields for this line when he wrote his testimony (N.T. 880-881).

On redirect, Dr. Liboff reiterated his opinion that experimental results were not free standing to establish a health hazard (N.T. 884). He added that in the bioelectromagnetic community, various inputs are weighted (N.T. 884). He continued that if enough biological studies and other studies in a totally different area are available, then conclusions are drawn which, although not proving potential hazard, certainly tend to provide a basis on which such discussions concerning hazards might be more detailed in terms of taking these as real possibilities (N.T. 884).

When asked whether there is a consensus in the area of physics that one must know the pathway in order to reach a conclusion on cause and effect, Dr. Liboff replied that the area of physics is a bad example of what you are trying to say (N.T. 901). He stated in physics, pathways are demanded and for that reason, more is asked of the scientist (N.T. 901). He continued that in the biophysics area, you want an efficacious result so pathways are of less interest to clinicians and of more interest to scientists (N.T. 902).

Dr. Liboff then confirmed that he testified that looking for confounders was a good thing (N.T. 919). He then explained what confounders were, using the example of childhood leukemia's association with wire codes (N.T. 919-920). He also explained in epidemiology that there are two variables that you

are trying to get a relation between and a confounder is something that basically fools the epidemiologist so a person who thinks he is studying wire code may actually be studying traffic density nearby or the level of income (N.T. 920). He ventured that some of these epidemiological studies may result in correlations in which leukemia deaths might be confounded, not with the power line, but what the power line relates to: traffic density, income, etc. or formaldehyde or pitch connected with the poles (N.T. 921). He also ventured that the confounder might be something else to do with the magnetic field so that the confounder concept can be used both to tear down the problem of magnetic fields causing cancer, or it can be used ultimately to make the problem more possible (N.T. 922). He agreed that confounders were the same as hidden variables in lay terms (N.T. 922).

On recross, Dr. Liboff was questioned about his statement that there was a possibility that the confounders seen in epidemiological studies might be something else that might be magnetic (N.T. 931). He testified that that was the spirit of what he said and allowed that it might be some other magnetic source other than the power line (N.T. 932). He added that it could still be related to the power line -- perhaps it's geographical orientation (N.T. 932).

Ronald C. Turner of Ronald C. Turner & Associates, architects and planners, Post Office Box 68, New Hope, PA, is a professional land use planner and testified that over the last 40 years, the six townships crossed by the Woodbourne-Heaton Line have shifted from rural and low density communities to flourishing suburbs with intense land uses. In 1950, the townships had a population of 31,285; by 1990, that figure had grown to 161,310. Some of the land uses adjacent to the line include Eastern Montgomery County Vocational Technical School, Willow Grove Day Care, Mason's Mill Park, Southampton Industrial Park, Playwicki County Park, Langhorne Country Club, Buehl Airfield, and residential developments (Protestants' Statement No. 1 [Turner] at 1).

Mr. Turner stated that

> the land use patterns around the Line have intensified at an extraordinary rate over the past four decades and are expected to continue into the future. This continued urbanization of the large townships is a significant factor in deciding whether or not the Woodbourne-Heaton Line should be energized (Protestants' Statement No. 1 [Turner] at 1).

Mr. Turner also testified that

> Research on electromagnetic radiation and its effects . . . is extensive and still quite active and does legitimize the concerns of local governments which are entrusted with protecting the public's health, safety and welfare (Protestants' Statement No. 1 [Turner] at 2).

Mr. Turner testified that standards for the strength of EMFs from lines exist in New York, Florida, Britain, Japan, Poland and the ex-Soviet Union (Protestants' Statement No. 1 [Turner] at 2-3). Uncertainty and fear with respect to EMF risks constitute a variable now significant in the planning and regulating of utility lines and public facilities. Mr. Turner expects that the regulatory stance of communities will shift the burden of proof to operators of facilities which emit EMFs and put all such land uses as conditional use subject to review. He also anticipates that standards will be created limiting off-site impacts beyond rights-of-way. He offers highways and accompanying sound walls as an example (Protestants' Statement No. 1 [Turner] at 3-5).

Mr. Turner testified that fear of EMFs provides motivation for families to leave their homes. Disinvestment leads to changes in land use patterns generally associated with higher density housing, conversions, and ultimately as last resorts for persons of moderate to low income (Protestants' Statement No. 1 [Turner] at 5-6). Mr. Turner stated that as long as there is uncertainty and disagreement about EMF issues, there is a "high probability" that one result will be, "changes in land use, which are contrary to local policy and zoning . . . in the areas immediately adjacent to transmission lines" (Protestants' Statement No. 1 [Turner] at 6).

On cross-examination, the witness testified that he was an architect and planner and had a Bachelor's degree in architecture, but not a Masters or Doctorate degree (N.T. 519).

Mr. Turner testified that the population of Northampton Township increased over 1,475% over the last 40 years and was one of the areas he referred to as had continual urbanization (N.T. 536, 537). Mr. Turner testified that it is between four to five miles from the upper part of Northampton Township to the power line (N.T. 546). Mr. Turner testified that he did not include data about the growth and urbanization of Northampton Township just in the area of the power line, but that all of Northampton Township was included (N.T. 547).

When asked if he testified that he believed the impact from the line would be concern about the EMF issue, Mr. Turner replied that he focused only on that concern. He discounted other concerns which might have dealt with aesthetics and parking and other noise because there had been a line there before (N.T. 548, 548).

Mr. Turner then testified that his population increase study included Hatboro Borough whose population had grown over 50% in the last 40 years (N.T. 550). Mr. Turner testified that Hatboro Borough is one of the areas undergoing what he called "continual urbanization," which he indicated should be a significant factor in deciding whether to energize this line

(N.T. 551). He further testified that Hatboro Borough is fairly well developed at this point and will not have much additional population unless there are significant divestitures of public facilities; it has been urbanized over the period from 1950 to 1990 (N.T. 550). Mr. Turner testified that the line does not enter Hatboro Borough directly, but that it is immediately south of the borough (N.T. 550). Mr. Turner testified that Hatboro Borough is within a half mile of the line, but that he was not sure (N.T. 551).

Mr. Turner testified that in his study he attributes an increased population over the last 40 years of over 400% for Lower Moreland Township (N.T. 553). When asked if [Lower Moreland Township] is another area he identified as having continual urbanization that should be a significant factor in deciding whether to energize the line, Mr. Turner answered yes (N.T. 553-554). Mr. Turner testified he did not know how large Lower Moreland Township was in square miles (N.T. 554). He then testified that Lower Moreland Township extends approximately two miles away from the power line (N.T. 554).

When asked, Mr. Turner testified that for all the townships identified and worked on his exhibit, the included data on population growth was for the entire township rather than the portion of the townships in the vicinity of the power line itself (N.T. 555).

When asked if it would be fair to say that one of the reasons he recommended delaying energizing this line is because of claimed effect on property values, Mr. Turner responded in the affirmative (N.T. 556). When asked if he was a licensed real estate agent or broker, Mr. Turner indicated that he was not (N.T. 560). When asked if he was an appraiser or conducted any land appraisals, Mr. Turner also testified in the negative (N.T. 560). When asked if he had conducted any formal appraisal of the property values for the line, Mr. Turner testified that he did not (N.T. 560).

When asked if it was his position that energizing the line will affect property values and cause disinvestments, Mr. Turner testified yes (N.T. 561). Mr. Turner then testified that when he talks about decreased property values he was talking about a change in market values of the property (N.T. 561).

Mr. Turner then testified that the basis for his property value opinion was his own research and interviews and listening to the testimony of the Applicant and the Protestants (N.T. 563). He further stated that the interviews and listening to the Protestants confirmed to him that there was a real fear of the EMF issue (N.T. 564). When asked if the interviews he referred to in previous testimony were with members of PAUSE, the same organization involved in this proceeding, Mr. Turner answered yes (N.T. 565). Mr. Turner then testified that the

PAUSE members expressed concerns about the impact on property values as well as on health values (N.T. 566).

Mr. Turner also testified that he relied upon some research for his conclusions regarding an impact on property values (N.T. 568). He stated that in interrogatories 15(a), (c), (d) and 22, he was asked to provide his research on this issue and indicated he gave [PECO] an annotated bibliography which was prepared under his direction (N.T. 568-569). Mr. Turner testified that he had read in full each of the documents in his annotated bibliography (N.T. 569). Mr. Turner then stated that his reading of the documents was a combination of reading entire studies or summaries only where summaries existed (N.T. 570).

Mr. Turner then testified that his property value research provided initial evidence of 15 to 25% reduction in property values (N.T. 571). When asked if it would be accurate to say that in one reference, the author Kinnard found that there was no negative effect on the value of property, Mr. Turner responded that in a previous study Kinnard found no evidence of negative impacts [Reference 16 of Interrogatory 15(d)] (N.T. 571-572). Mr. Turner admitted that to the best of his recollection that the article by Kinnard he cited also stated that there was no decrease in property values (N.T. 572).

Mr. Turner testified that Reference 17, an article from Fortune Magazine, was the source of the statement in his

testimony that property values could decrease 25% after the power line was energized (N.T. 572). Mr. Turner admitted that the Fortune article "suggested" that property values could decrease, and that the Fortune article was five pages long and had one paragraph on property values (N.T. 572-573). Then Mr. Turner stated that the paragraph basically refers to a statement by a David Lewis of Houston, Texas, estimating that house near transmission lines would drop 25% in value (N.T. 573). Mr. Turner testified that he did not know if Mr. Lewis was talking about a situation where a power line was going to be placed in an existing corridor such as a railroad, and did not investigate whether it was comparable to the existing circumstances (N.T. 573). Mr. Turner then testified that he did not know whether Mr. Lewis did an appraisal to come up with his 25% number (N.T. 573).

Mr. Turner admitted that many of the articles he relied on for his opinion about decreases in property values caused by EMF and transmission lines made no reference to appraisal or property value data and actually found no effect on property values by transmission lines (N.T. 575-582).

When asked about whether or not property values will decline, Mr. Turner testified that if people think they will decline and they are motivated by fear, they will tend to sell (N.T. 592). He further testified that he thinks it is clear that if buyers also become aware of electromagnetic field impacts and

the possibility of health impacts, they will be looking at these properties in the same way and values will decrease (N.T. 592).

Mr. Turner then confirmed in his testimony that the Franciscan Health System was a project identified in his interrogatories (N.T. 617). He further confirmed that he did not recommend the project not be built or be delayed because of EMF from an adjacent transmission line (N.T. 617-618).

On redirect, Mr. Turner testified that his conclusion was that the energizing of the line, given public perception of its health effects of the line, would cause a diminution of the values of the real estate and diminution of the quality of life of persons living adjacent to the line (N.T. 677).

B. PECO's Case

Ronald Oedemann, a PECO engineer who is a Senior Member of the Institute of Electrical and Electronics Engineers ("IEEE"), testified that the construction, maintenance, and operation of the line meet all applicable requirements of the National Electrical Safety Code ("NESC") and the Commission's safety regulations (PECO Statement No. 1 [Oedemann] at 2, 9).

Mr. Oedemann also presented the information on line design requested by Commissioner Rhodes. The line has a "compact delta" design built on the existing Conrail transmission line poles (PECO Statement No. 1 [Oedemann] at 5). Mr. Oedemann also described three other designs that have been used on other

transmission line rights-of-way: the "flat", "vertical" and "longer-span delta" designs. Mr. Oedemann testified that none of these designs provides any safety advantages over the compact delta design. Id. at 13. Use of a flat, vertical or longer-span delta design for the line would have required installation of new poles along the length of the right-of-way. Id. at 12. The horizontal and longer-span designs would have required acquisition of additional right-of-way. Id. None of these designs could have been used for the entire length of the transmission line due to height restrictions near an adjacent airport. Id. Mr. Oedemann also testified that use of any of these designs would have cost millions of additional dollars compared to the compact delta design. Id. at 13.

On cross-examination, Mr. Oedemann testified that he did not know how much loading was on the Conrail Line from 1981 to 1986; the voltage was 132,000 volts (N.T. 10). The PECO line is to be positioned in the center of the 60 foot easement along its entire 12.8 mile length (N.T. 11).

Upon reviewing his response to the Office of Consumer Advocate's (OCA) Interrogatories Set I, No. 8, Mr. Oedemann testified that the cost information and field calculations in his prefiled testimony were conducted some time after the initial design was completed. That information was prepared in July of

1991. Mr. Oedemann stated that in July 1991, construction of the line was approximately 90% complete (N.T. 12-13).

Mr. Oedemann testified further that he did not think that it was necessary to mention alternative designs in PECO's Letter of Notification (N.T. 19). The selection of the compact or tight delta configuration was driven by the fact that the Conrail right-of-way had structures which required the use of the tight delta design which results in low EMF fields (N.T. 27). However, absent some special factor, the tight delta design is not a PECO preference (N.T. 27).

At the time of choosing the line design, Mr. Oedemann testified, no formal calculations were made of EMFs, but he knew through experience that the compact delta would result in lower fields. He did not discuss the issue with anyone. He has had experience taking EMFs into account in designing lines (N.T. 20-21).

Mr. Oedemann testified that PECO began looking at the EMF issue over the last four or five years and taking it into account in line designs (N.T. 24). Now PECO endeavors to build lines that result in lower fields at a modest increase in cost, in order to "make the line as safe as we possibly can for our neighbors" (N.T. 23). He testified that PECO practices prudent avoidance to minimize EMF and any possible health effects (N.T. 29). If PECO had had an unconstrained right-of-way, in which to

build the Woodbourne-Heaton Line, it would keep the line as far as possible from the edge of the right-of-way "to keep EMF levels at the edge of the right-of-way as low as we can" (N.T. 31). The route selected was selected as obviously the best route as it was almost a straight line. Mr. Oedemann did not formally investigate other routes because the area "is so built up that buying a new route would be unheard of" (N.T. 32).

Mr. Oedemann testified that no requirements in the NESC codes relate to EMF considerations. While testifying that PECO seeks lower EMFs to make lines safe, he stated that he did not list EMF reduction in his prefiled testimony as having been considered because to him "EMF is not really a safety issue to keep the public from getting hurt by the Line" (N.T. 35, 36). He testified that PECO cares about EMF because of the inconclusive evidence related to health risks but that it is not a safety issue (N.T. 36). Mr. Oedemann did not recall seeing "ABCs of EMFs" published by PECO (N.T. 41). That pamphlet asks citizens to consider what one researcher has called prudent avoidance, and explained that prudent avoidance is simply common sense reduction of exposure to electric and magnetic fields, and then the pamphlet gives examples of reducing exposure to EMFs from household appliances and electrical devices (Protestants' Exhibit 1, back page).

Mr. Oedemann also testified that in the design generally, the height of a line is adjusted to account for the topography being crossed. PECO compensates for deviation where a railroad is in a cut, i.e., the line is raised so that the conductors will be the same elevation above the ground (N.T. 41-42).

Charles Boeggeman, a PECO engineer who is Chairman of PECO's EMF Task Force, presented the information on electric and magnetic field levels requested by Commissioner Rhodes. Mr. Boeggeman explained that electric fields, which are measured in "kilovolts per meter" ("kV/m"), and magnetic fields, which are measured in "milligauss" ("mG"), are associated with all uses of electricity (PECO Statement No. 2 [Boeggeman] at 5). Mr. Boeggeman explained that magnetic field levels depend upon several factors, including the amount of electric current present and the distance from the source of fields. For example, he testified that the fields associated with appliances can range from 0.1 mG to as much as 20,000 mG, depending upon which appliance is used and how close to the appliance measurements are taken. Id.

Mr. Boeggeman conducted computer-assisted calculations of the electric fields and magnetic fields that will be associated with the line, out to 300 feet on either side of the line (PECO Statement No. 2 [Boeggeman] at 5-10). Under normal

operating conditions, magnetic fields associated with the line will be less than 26 mG at the edge of right-of-way, and less than 0.65 mG at a distance of 300 feet (Id. at 9, PECO Exh. No. 2 at 6, 8). The electric fields associated with the line will be approximately 1.2 kV/m at the edge of the right-of-way (PECO Statement No. 2 [Boeggeman] at 7). Mr. Boeggeman also calculated the electric and magnetic field levels for the flat, vertical and longer-span delta designs. Mr. Boeggeman's calculations indicated that the compact delta design results in lower field levels than any of the other designs (PECO Statement No. 2 [Boeggeman] at 11-12; PECO Exhibit No. 2 at 15-29).

On cross-examination, Mr. Boeggeman testified that there will be a load on the Woodbourne-Heaton Line all day barring out-of-service time (N.T. 48). In calculating electric and magnetic fields, Mr. Boeggeman did not factor in the currents of the existing Conrail rail lines nor did he factor in parallel pipelines either (N.T. 49). In making his calculations, he relied on a 12 foot phase spacing. He testified that he had used 14 foot phase spacing in the calculations done in response to OCA Interrogatory Set I, No. 2 because Mr. Oedemann's exhibit shows a variation in phase spacing of 12 to 15 or 16 feet. Since 90% of the line has 12 foot spacing he later decided to use that number in calculations. Wider spacing exists at rolls on deadend turns;

there is 14 foot spacing at rolls and 16 foot spacing at deadends. EMFs increase with wider phase spacing (N.T. 51-52).

Mr. Boeggeman testified that the calculations of the magnetic fields were done by him in approximately July 1991 in preparation for his present testimony (N.T. 50).

On further cross-examination, Mr. Boeggeman testified that another alternative design that has a different EMF result is called split phase, which is similar to double circuit vertical. Subject to phase spacing, this design could achieve lower levels of EMF than the tight delta. Mr. Boeggeman testified that the "fact that . . . [he is] aware of the split phase went through . . . [his] mind," but he thought that compact delta presented less fields though he stated that he did not "formally" evaluate the split phase design for this line. He did not recommend split phase because, "we could not use the existing structures to do that" (N.T. 58-59).

Mr. Boeggeman went on to testify that he did not try to evaluate and describe in quantitative or qualitative fashion the risk of health effects associated with either the selected or alternative designs; no one at PECO did. The company does not have a procedure for evaluating and describing either qualitatively or quantitatively the EMF risk associated with different line decisions (N.T. 59-60). Mr. Boeggeman stated, "We have not calculated risk nor have we hired anyone because there

is no known risk. There is no established risk" (N.T. 61). However, testified Mr. Boeggeman, since the New York power study was released in 1987, PECO has been proactively addressing the EMF issue (N.T. 64). Also, he testified before a Congressional Committee in 1990 that PECO has experienced some delays in projects due in part to customers' concerns surrounding EMFs (N.T. 66). Mr. Boeggeman testified further that he helped prepare PECO's literature on EMFs (N.T. 66; Protestants' Cross-Examination Exh. 1); that the information about prudent avoidance was taken from the Office of Technology Assessment (OTA) Report. PECO did not make any independent judgment to advise customers, but it pointed out the OTA Report so the public can make up its mind absent any verification of the risks (N.T. 67-68). When asked whether PECO concurred with or dissented from the OTA recommendation, Mr. Boeggeman testified that, "We don't say it. We say consider what one researcher says . . . So that they can make their own decisions. It is something that is out there. We felt the responsibility to let them know what was out there" (N.T. 68-69).

Further testifying on the subject of EMFs, Mr. Boeggeman testified that he did state in testimony to Congress that it is PECO's policy to treat EMF as a societal issue (N.T. 74). In explaining that statement, Mr. Boeggeman stated:

> It means that society as a whole are exposed to both electric and magnetic fields. We

live with this daily in our lives. And by virtue of that exposure, it is a societal issue (N.T. 74-75).

According to Mr. Boeggeman, prudent avoidance was practiced with respect to the Woodbourne-Heaton Line. He testified that the design chosen for the line "just fell in our laps" as being optimum for reducing EMFs; "We didn't have to do anything extra to reduce the fields" (N.T. 75). Mr. Boeggeman testified that to change the towers and come in with an outlandish design to reduce EMF levels further is not prudent (N.T. 76). Mr. Boeggeman stated that he does not agree that prudent avoidance cannot be practiced without considering a range of alternative methods of achieving desired and/or needed power (N.T. 78-79).

Mr. Boeggeman also testified that the loading scenarios for the line - which he used to calculate EMF levels - were "estimated" by PECO Systems Planning Personnel (N.T. 71). He is not familiar enough with the network system to know whether systems planners could elect to increase the average load; if the load were increased, magnetic field levels would be increased (N.T. 72-73).

J. Michael Silva presented information about the magnetic fields that people encounter in everyday life. Mr. Silva has conducted exposure assessment projects around the world for electric utilities, school districts, state, federal and

international government agencies such as the Cancer Control Agency of British Columbia, universities such as Stanford University, and Kaiser Permante Hospitals (PECO Rebuttal Statement No. 6 [Silva] at 7). Mr. Silva developed the EMDEX personal dosimetry meter, which is the state-of-the-art instrumentation for measuring magnetic field exposures. He also supervised development of the Expo-Calc computer program, which is one of the primary computer programs that is used to calculate electric and magnetic fields from transmission lines (Id. at 3). He is currently conducting EMF exposure assessment research with the National Cancer Institute, Johns Hopkins University, and the University of North Carolina (Id. at 7).

Mr. Silva described the common sources of electric and magnetic fields, such as household wiring, lighting, transmission and distribution facilities, and appliances (PECO Rebuttal Statement No. 6 [Silva] at 10). Mr. Silva also made actual magnetic field measurements at various public locations in Langhorne and Philadelphia to provide information on magnetic field levels. Mr. Silva measured magnetic fields from a fraction of a mG to 760 mG, with many fields in the range of 1-10 mG (Id. at 13-14; Exh. JMS-3, Exh. JMS-4).

Mr. Silva compared the fields from the line with the fields routinely encountered in everyday life, as well as those associated with other transmission lines, and stated that:

> In comparison to other, similar transmission lines, there is nothing unique or unusual about the fields associated with the Woodbourne-Heaton 230 kV transmission line. The electric and magnetic fields that will be associated with the Woodbourne-Heaton line are in the same range as levels from other similar 230 kV lines. The magnetic field levels associated with the 230 kV line are within the range that people routinely encounter in everyday life from a variety of sources.

(PECO Rebuttal Statement No. 6 [Silva] at 19)

Mr. Silva also addressed the question of whether the line is consistent with the concept of "prudent avoidance," which is "one possible framework for analyzing exposure to electric and magnetic fields" (PECO Rebuttal Statement No. 6 [Silva] at 15). Mr. Silva is an electrical engineer and a senior member of the IEEE with extensive experience designing transmission facilities (Id. at 1-2, 6). Mr. Silva combined this experience with his exposure assessment expertise to evaluate the design, route and field levels of the line and concluded that the line is consistent with the concept of prudent avoidance (Id. at 17-18).

Mr. Silva testified that prudent avoidance allows us to act and move forward while research continues. Delaying projects because of the current state of scientific knowledge runs contrary to the basic assumptions of prudent avoidance as he understands it (PECO Rebuttal Statement No. 6 [Silva] at 19).

In oral testimony, with reference to the concept of similarity-basing, Mr. Silva testified that a 230 kV line

compared to a 230 kV line is similar; it's a matter of lines and voltage classification and not a health-based standard (N.T. 1311). Some of the lines that are similar to the proposed line were designed and placed in service as much as a half a century ago (N.T. 1312).

Mr. Silva's measured walk with EMDEX II in Langhorne was not along the proposed line route (N.T. 1312).

Mr. Silva testified that the concept of prudent avoidance as applied by the Office of Technology Assessment does not have a temporal component as to when prudent avoidance comes into play; prudent avoidance could be applied before or after a design is selected (N.T. 1313, 1314).

When asked how prudent avoidance could alter field levels if implemented after design and construction, Mr. Silva responded

> . . . if I can give an analogy from the OTA report itself, they suggest that prudent avoidance might be buying an appliance if it was available that had very low field levels. But the prudent part of prudent avoidance, the OTA report goes on to explain, would not indicate using that appliance until your old one wore out. So even if there is a field-free appliance on the market and you may want to buy it, they suggest waiting until your other one wore out before you would buy it (N.T. 1319-1320).

Mr. Silva testified that the average life of a power line must be 30 or 40 years (N.T. 1320).

Mr. Silva further testified that he would agree with PECO's literature that prudent avoidance is common sense reduction of exposure to EMFs (N.T. 1326). The concept of prudent avoidance is expending modest efforts in having lower exposure or lower field levels (N.T. 1332). If an individual makes no efforts, it is consistent with this understanding of prudent avoidance (N.T. 1336).

Mr. Silva testified,

> To me, the idea of buying a low field appliance but then not using it until your other one wears out provides a context for understanding how far overboard you should go on appliances and all these things until we have more information (N.T. 1344).

He characterized the OTA report by analogy:

> If you can buy an electric blanket that has zero field, go ahead and buy it, but we would not recommend that you do that until your old one wore out . . . That means that lower is better but to me it provides a qualitative factor that lower may be better but maybe not a whole lot, we're not sure, so why don't you wait for four or five years until your old one wears out (N.T. 1345).

When asked why OTA doesn't say buy a higher field blanket, Mr. Silva testified, "I don't know why they didn't put it in there. I don't know if you can go out and make a higher field blanket" (N.T. 1345).

Carter Van Dyke, on Rebuttal, testified about land use issues. Mr. Van Dyke is a land use planner and landscape architect with graduate level training in those disciplines (PECO

Rebuttal Statement No. 5 [Van Dyke] at 1). He is a licensed Professional Planner and a registered landscape architect (Id.). Mr. Van Dyke has prepared land use codes and comprehensive plans and has developed land use guidance documents for housing developments and for linear projects such as highways (Id.).

Mr. Van Dyke conducted a land use study of the region, including all of the municipalities discussed by Mr. Turner. Mr. Van Dyke referred to this area as the "Regional Study Area" or "RSA." Mr. Van Dyke's study included analysis of existing utility facilities, natural features and urban development in the region (PECO Rebuttal Statement No. 5 [Van Dyke] at 4-5). In addition, Mr. Van Dyke conducted a detailed analysis of land uses within the "Corridor Study Area" or "CSA," which is a corridor 400 feet on either side of the transmission line right-of-way. Mr. Van Dyke visually analyzed aerial photographs of the entire length of the line to identify all land uses within the CSA. (Id. at 9; N.T. 1251-52; Exhibit CVD-8). His analysis of the CSA included detailed descriptions of existing zoning, existing land uses and residential density and population both now and projected for the future (Id. at 8-11).

Mr. Van Dyke explained that his analysis of the CSA demonstrated that it is not a high density urban area (PECO Rebuttal Statement No. 5 [Van Dyke] at 11). Mr. Van Dyke also analyzed the restrictions created by natural features, existing

zoning restrictions and existing land uses within the CSA (Id.). He concluded that the CSA would not reach high density even if it became fully developed (Id.).

Mr. Van Dyke testified regarding whether energizing the line will cause adverse land use impacts. He explained that, when the existing zoning and land uses adjacent to the line were established, the existing utility corridor was being utilized for both a high-speed freight railway and the transmission of electricity (PECO Rebuttal Statement No. 5 [Van Dyke] at 12-13). Mr. Van Dyke explained that the existing land uses and structures thus were specifically chosen as appropriate for close proximity to these utility functions (Id.). Mr. Van Dyke concluded that continued use of the right-of-way as a utility corridor, including energization of the line, will not affect the current zoning and land uses (Id. at 11-15).

Mr. Van Dyke also addressed the issue of property values. Mr. Van Dyke explained that, since the existing residential uses near the transmission line were developed in the immediate context of an existing utility corridor which contained transmission poles and conductors and a highly intrusive high-speed freight railway, the market would already have fully compensated for proximity to utility functions (PECO Rebuttal Statement No. 5 [Van Dyke] at 13-14). Mr. Van Dyke also examined all major existing utility functions in the 60-square mile

Regional Study Area to determine whether they have had adverse impacts on land use, zoning, or property values. His assessment "did not reveal any adverse effects on land use, zoning, or property values in the areas adjacent to those utility uses" (PECO Rebuttal Statement No. 5 [Van Dyke] at 14).

Mr. Van Dyke testified that his corridor study area relates to use impacts of the Woodbourne-Heaton Line route, while the regional study area relates to looking for the best route (N.T. 1250-1251). He studied the area within a boundary of 2-1/2 miles to the north and south of the line, and the extent of the distance between Heaton and Woodbourne substations (N.T. 1272). Four hundred feet from either edge of the right-of-way was necessary for the corridor study in order to get a good approximation of the adjacent land uses, Mr. Van Dyke testified (N.T. 1276).

Mr. Van Dyke testified that he took into account the public fear of EMFs in concluding that there was no effect on the market valuation of homes. To do this, he reviewed Ronald Turner's testimony, but he did not interview the Protestants nor is he familiar with the PECO exhibits which recommend consideration of prudent avoidance (N.T. 1284).

Mr. Van Dyke agreed that perceived fear is one particular value, amongst many, that goes into people's choices of where to live (N.T. 1288). Public opinion and factors that

the public take into account are relevant in establishing market value (N.T. 1290).

While basic land use policy dictates that utility services must be provided in coordination with urban growth, it also involves providing utility corridors in the least intrusive way (N.T. 1299-1300).

Mr. Van Dyke testified that the utility infrastructure is a necessary component of normal planned urban growth (N.T. 1301). But since the corridor study Area in Mr. Van Dyke's estimation shows a very limited growth potential, he concurred that the principal that you must provide utility infrastructure with urban growth has a "very limited application as far as this corridor is concerned" (N.T. 1301, 1303).

Dr. Murray Rosenberg addressed the EMF research in the area of physics. Dr. Rosenberg is a medical doctor and a Ph.D. physicist. Dr. Rosenberg is Professor of Genetics and Cell Biology at the University of Minnesota, where he conducts biophysics research. He was chosen as the first director of the federal government's program to establish biophysics as a science in the United States. Dr. Rosenberg was also chosen as the first director of the National Science Foundation's program to stimulate interest in the biophysics study of human cells (PECO Rebuttal Statement No. 4 [Rosenberg] at 1-5).

Dr. Rosenberg reviewed the "electromagnetic spectrum," including ionizing radiation, microwaves, and radiofrequency waves, as well as the power frequency fields that will be associated with the Woodbourne-Heaton line. He explained that each region of the spectrum "has unique biological properties" and that 60 Hz power frequency fields are very different from fields at frequencies other than 60 Hz (PECO Rebuttal Statement No. 4 [Rosenberg] at 10-14). Dr. Rosenberg also explained the difference between "sinusoidal" fields, such as those that will be associated with the line, and "pulsed" fields and "modulated" fields, which will not be produced by the line (Id. at 14-17). He explained that such pulsed and modulated fields contain many frequencies far different from 60 Hz fields, and that "it is inappropriate to attempt to draw conclusions about power frequency fields based on a study using many frequencies" (Id. at 16).

Dr. Rosenberg also addressed Dr. Liboff's "ion cyclotron resonance" hypothesis and explained that it has a "number of fundamental problems . . . that demonstrate that it is not an accurate description of any interaction between power frequency fields and biological tissue" (PECO Rebuttal Statement No. 4 [Rosenberg] at 17). After reviewing those problems at both the theoretical and experimental levels, Dr. Rosenberg concluded

that: "the ICR hypothesis has no implications for human health" (Id. at 20).

On cross-examination, Dr. Rosenberg testified that you could get biological effects by turning a sinusoidal wave off and on; transients such as turning a line on off would disrupt a sinusoidal wave (N.T. 1217, 1218).

The ICR hypothesis does not make sense to Dr. Rosenberg from a physical point of view (N.T. 1219). He testified that he was being conclusive about impossibility of ICR hypothesis (N.T. 1222). Some groups have indeed found effects such as an increase in calcium efflux, and others a decrease (N.T. 1223-1224).

Dr. Rosenberg testified that if ICR does in fact work in bone healing, there is no good explanation. He would not comment on whether it actually does work or not (N.T. 1225). When asked whether or not it is the case that if the literature is correct in reporting that EMFs have an effect in orthopedic treatment that the problem is then how to explain the effect, Dr. Rosenberg said he was not qualified to answer (N.T. 1227). Nor does he have an explanation for the effects that Liboff and others have found (N.T. 1235). He is willing to say that exposure to EMFs will not result in adverse health effects in humans (N.T. 1238).

Dr. Edward Gelmann addressed the molecular genetics and cellular biology research. Dr. Gelmann is a medical doctor

specializing in the study and treatment of cancer. He is Professor of Medicine, Professor of Anatomy and Cell Biology, and Chief of the Division of Medical Oncology at the Vince Lombardi Cancer Center at Georgetown University Medical School. Dr. Gelmann has conducted research on the cellular and molecular biology of human cancer for the past 15 years, first at the National Cancer Institute, now at Georgetown (PECO Rebuttal Statement No. 3 [Gelmann] at 1-3, Exh. EG-1 at 1).

Dr. Gelmann explained that a large body of 60 Hz research has been conducted on molecular genetics and cellular biology issues. In particular, extensive research has been conducted on biological endpoints involved in the process of carcinogenesis. This research has included mutational analyses, chromosome studies, animal studies, and tumor growth studies (PECO Rebuttal Statement No. 3 [Gelmann] at 8).

Dr. Gelmann explained that an agent cannot cause cancer if it does not cause mutations in the cell's DNA (PECO Rebuttal Statement No. 3 [Gelmann] at 6). Mutational analyses have determined that power frequency fields do not cause DNA mutations (Id. at 9). Chromosomes contain the DNA, and thus studies of an agent's effect on chromosomes tell whether an agent has potential to cause cancer. Chromosome studies have shown that EMF is not associated with damage to chromosomes (Id. at 11). Studies on whole animals have "a broader potential" to observe abnormalities

in functions such as reproduction, growth, or development, that would be affected by genetic change. Extensive animal studies "provide no scientific basis to conclude" that EMF causes cancer or any other adverse health effect (Id. at 14). Tumor growth studies are a direct test whether exposure to an agent affects the development or progress of cancer. The EMF tumor growth studies indicate that exposure to EMf, "either before or after implantation of a tumor into the animal host, does not affect the development of a tumor" (Id. at 15).

Dr. Gelmann also reviewed the cellular and molecular research that had been referred to by Dr. Liboff and Mr. Janes, such as the research by Goodman, Adey, and Marron (PECO Rebuttal Statement No. 3 [Gelmann] at 16). Dr. Gelmann reviewed the design, findings, and implications of each study individually. He concluded about this research that:

> [A] careful analysis of the studies indicates that, even if the results are valid, they do not indicate that exposure to power frequency fields affects carcinogenesis. The endpoints studies are simply not related to that process.

(PECO Rebuttal Statement No. 3 [Gelmann] at 21)

Dr. Gelmann concluded that:

> The extensive research on molecular and cellular biology and cancer provides no scientific basis to conclude that power frequency electric and/or magnetic fields cause, promote, or contribute to the development of cancer or other adverse health effects. This is consistent with the

> conclusions reached by independent scientific commissions and agencies that have reviewed this research, such as the American Institute of Biological Sciences, the Virginia Department of Health, the Maryland Department of Natural Resources, and the California Department of Public Health.

(PECO Rebuttal Statement No. 3 [Gelmann] at 22, 23)

On cross-examination, Dr. Gelmann testified that his opinions in his written testimony were limited to oncology, and molecular and cellular biology (N.T. 1142). He has published no articles on EMFs and cancer beyond a review of the literature (N.T. 1147-1148). His analysis was based on his reading of the experiments described in the literature (N.T. 1149).

Dr. Gelmann testified that the epidemiologic studies which he read have no bearing on his opinion one way or the other (N.T. 1169). He also stated that in scientific knowledge, one must take all information and assess it for its worth. He was not asked to assess epidemiology and it is beyond the scope of his expertise (N.T. 1171).

Dr. Gelmann testified that if studies showed an association or purported to show an association between exposure to electric and magnetic fields and childhood leukemia, it would not change his opinion that EMFs have no effect on cancer, based on the studies he has reviewed and his own expertise. If there were epidemiologic studies purporting to show an effect of EMF

exposure on cancer incidence among occupational fields of adults, it would not change his testimony (N.T. 1179).

Dr. Gelmann declined to express an opinion about whether effects on melatonin production by the pineal gland have any health effects or may have any health effects (N.T. 1181-1182). Outside of his area of expertise or what he has written in his report, he would not express an opinion as to whether the reduction of production in the pineal gland has any adverse health effects (N.T. 1182). He would not give an opinion as to whether EMF exposure slows heart rates (N.T. 1184-1185). He did not intend to express an opinion as to the effects of EMFs on reproduction (N.T. 1185-1186). Dr. Gelmann has no conclusions on cyclotron resonance theory (N.T. 1189).

Dr. Gelmann testified that he did not agree that melatonin reduction is a cancer promoter (N.T. 1193). He does not know if EMFs affect cell proliferation in connection with bone healing, though he has reason to doubt that phenomena (N.T. 1193, 1194).

Dr. Richard Bockman addressed the scientific research in the fields of endocrinology and immunology. Dr. Bockman is a medical doctor specializing in endocrinology and immunology. He also holds a Ph.D. in biochemistry. He is Professor of Medicine at Cornell University Medical College and Head of the Endocrine Service and the Endocrine Bone Service at Cornell Medical

School's Hospital for Special Surgery, where he conducts endocrine research (PECO Rebuttal Statement No. 1 [Bockman] at 1-2).

Dr. Bockman reviewed a broad range of research on the endocrine and immune systems. With regard to the endocrine system, that review encompassed research on the neuroendocrine system, including perception events, neurochemicals, and calcium metabolism, as well as research on endocrine gland function, biological rhythms, and reproduction and development. With regard to the immune system, Dr. Bockman reviewed research on endocrine-regulated immune functions, as well as in vitro (cells in glass dishes) and in vivo (live animal) research on the immune system. Dr. Bockman provided his evaluation of that body of research:

> My overall conclusion is that there is no basis to conclude that power frequency electric and/or magnetic fields have adverse effects on the health and function of the endocrine or immune systems.

(PECO Rebuttal Statement No. 1 [Bockman] at 27)

On cross-examination, Dr. Bockman testified that it is his opinion that in the area of reproduction and development, adequate experiments have been done, so he would not advocate more research. He also stated that no more research needs to be done in the area of calcium efflux studies. Given funds and priorities, Dr. Bockman is not sure that we need to do more

research with regard to this stimulus of EMFs in these areas of biology (N.T. 974). He does not think that this area of electric and magnetic is a very high priority or a very interesting area that is going to help elucidate some more interesting questions in biology; he doesn't see a pressing need for more research (N.T. 975).

Dr. Bockman testified that he has reviewed the areas of bone healing with strong EMFs and magnetic resonance imaging. Not everyone believes that magnetic fields help bone healing, and the mechanism by which such fields aid in the bone healing process is not known (N.T. 978-979).

Dr. Bockman further testified that he has not conducted research into the biological effects of power frequency fields such as those associated with transmission lines, nor has he published papers about the subject. He began to look into biological effects of EMFs only about six years ago (N.T. 980).

In reviewing the Wilson study discussed on page 17 of his prefiled statement, lines 25-34, he does not see deleterious effects from changes in the melatonin and circadian rhythm. He characterizes a deleterious effect as an adverse health effect which would mean that an animal was sick in some way (N.T. 995). He does not know what effect a prolonged decrease in melatonin would have on the body (N.T. 995-996).

Dr. Bockman testified that he is aware of continuing research in the areas of melatonin effects on a number of systems, including psychological systems (N.T. 997-998).

Dr. Bockman further testified that he and his colleagues are using EMFs to see if they enhance bone density. He is not aware of his hospital using EMFs in any orthopedic capacity (N.T. 1005, 1007).

Dr. Bockman knows that melatonin can inhibit the growth of one cancer cell line in vitro MCF-7 (N.T. 1020). The witness believes it to be only a hypothesis that melatonin may affect the availability of hormones required for growth of hormone-dependent breast, ovarian, and prostrate cancers; Dr. Bockman calls it a hypothesis (N.T. 1020); and that changes in melatonin secretion may affect production of other hormones such as estrogen and prolactin and alter the proliferation of normal, intermediate, or malignant cells (N.T. 1022).

Dr. Bockman did not consider the work of Graham and Cohen in forming his opinions (N.T. 1042). He has not read the work on resonance transport in membranes by Liboff, McCloud and Smith (N.T. 1044-1045). He is not familiar with Liboff's abstract Human Lymphoma In Vitro Proliferation Increases Following K-Plus Cyclotron Resonance Magnetic Exposure (N.T. 1045). Dr. Bockman may have perused abstract of Graham and Cohen on human cardiac activity in 60 Hz magnetic fields (N.T. 1045),

but he did not use Graham and Cohen, or Liboff, in reaching his conclusions (N.T. 1048). His opinion as to the validity of the Wertheimer-Leeper conclusions is based on criticism of their epidemiological quality and on a comparison of epidemiology animal research and other bases. His opinion is based on a scientific evaluation of epidemiological studies (N.T. 1049-1050). Dr. Bockman partly does and partly does not include epidemiology in forming his overall conclusions (N.T. 1051).

Dr. Bockman testified that as a practicing clinician in endocrinology he is influenced by epidemiological studies (N.T. 1052, 1056).

Dr. Philip Cole addressed the EMF research in the area of epidemiology. Dr. Cole is a medical doctor who also holds a doctorate in Public Health. Dr. Cole is Professor and Chairman of Epidemiology at the School of Public Health at the University of Alabama at Birmingham, and the Associate Director for Epidemiology at the Comprehensive Cancer Center at the University. Dr. Cole has provided epidemiologic assistance to agencies such as the International Agency for Cancer Research, and has received prestigious international honors, such as the Grand Prix Lacassagne from the French Cancer Society for his epidemiological research. In his 25 years as a cancer epidemiologist, Dr. Cole has published over 130 papers reporting

the results of his own epidemiological research (PECO Rebuttal Statement No. 2 [Cole] at 1-4).

Dr. Cole reviewed in detail each of the published epidemiological studies on EMF and childhood cancer, exploring the strengths and weakness of each (PECO Rebuttal Statement No. 2 [Cole] at 11-18). He concluded that the best-done studies -- and all of the studies with data on actual measured magnetic fields-- do not support a conclusion that exposure to EMF is related to cancer (Id. at 18).

Dr. Cole also commented on the recent draft EPA report on EMF and cancer, and noted the severe criticisms of that draft report that have been issued during the ongoing review process. For example, the National Cancer Institute commented with regard to the EPA report that:

> Four staff members, all well-versed in epidemiologic studies, reviewed the above document and written comments are provided. All reviewers agreed that the human epidemiologic data to date do not support the sweeping conclusion made in the EPA document. In our judgment the conclusions presented remain scientifically unsound and unnecessarily alarming.

(PECO Rebuttal Statement No. 2 [Cole] at 22).

Dr. Cole concluded that the EPA report should be "treated as a secondary source that is still in the process of review, and I give it little if any weight in my evaluation of the epidemiologic data" (Id.).

With regard to the entire body of epidemiological research, Dr. Cole concluded that:

> Taken together, the epidemiologic reports fail to demonstrate any strong or consistent pattern of association between EMF and cancer among human beings. Indeed, even among the positive studies, findings are not supported by the internal characteristics of the data. The summation can only be that, to date, there is no demonstrated relationship between EMF and cancer in human beings.
>
> Since I am of the opinion that EMF's have not been demonstrated to be carcinogenic, I believe that the 230 kV transmission line poses no threat of cancer to persons in its vicinity.

On cross-examination, Dr. Cole testified that he restricts his testimony to the question of EMFs and cancer. He testified that when he used the word "cause," he used it to mean "to increase the risk in general . . ." (N.T. 1083, 1084). Dr. Cole was not expressing an opinion as to whether or not EMF exposure increases risk of adverse health effects other than cancer. Nor does he distinguish between EMFs as a potential contributing factor to the development of cancer, and EMF as a possible contributing factor to the growth of cancer cells (N.T. 1084).

The consistently weak associations he discerns leads Dr. Cole to an inference as to causation. He testified that it is possible that variations in susceptibility to the development

of cancerous conditions among population subgroups can interfere with the consistency of study results (N.T. 1090).

Dr. Cole testified that being shown a valid biologically plausible mechanism for EMF interaction with cells would probably not change his mind as to EMF-cancer relationship, but would enter into his overall consideration (N.T. 1092-1093).

Dr. Cole agreed with the statement that the evidence as to the link between EMFs and cancer now available is too weak to allow firm conclusions either way, but says that such is not his position (N.T. 1097). On a scale of -100 to 100, where -100 corresponds to EMF having been demonstrated not to cause cancer and 100 corresponds to EMFs having been demonstrated to cause cancer, Dr. Cole's position is -70 (N.T. 1101, 1102). Dr. Cole believes that it is much more likely than not that the line poses no threat of cancer to persons in the vicinity (N.T. 1104, 1105).

Dr. Cole testified that the original Wertheimer study and the Savitz and Peters studies all contain information relevant to the link between wiring code and either childhood cancer or leukemia, and that each shows some positive results (N.T. 1112). He neither dismisses these studies nor forms opinions solely on the basis of them; he looks at the totality of epidemiologic studies (N.T. 1113).

Dr. Cole admitted that he does not have information as to what field readings would be at the edge of the right-of-way

or the center, under various load conditions (N.T. 1117). But he goes on to testify that the line is not going to produce enormous fields, but ones similar to those produced by other fields (N.T. 1118).

Dr. Cole testified that nobody holds the view that there is an established cause-effect relationship between EMF exposure and cancer (N.T. 1118). He is now beginning an epidemiologic study relating to EMFs, but has never done one before (N.T. 1122).

Dr. Cole can form an opinion or take a position about the Woodbourne-Heaton Line based on his position that EMFs are not an established cause of cancer. This line, given Dr. Cole's beliefs about the lack of EMF-cancer link, fits into an overall pattern. He believes that this line, like others, is not a cause of cancer (N.T. 1123).

Dr. Cole further testified that the Demers study was a case control study with no measurement of magnetic fields (N.T. 1463, 1468). He had a problem with the categories of EMF exposure used (N.T. 1469).

Dr. Cole explained that the Demers study shows an absence of dose-response and therefore cannot be taken seriously as demonstrating an EMF-cancer relationship. Only those exposed at an early age for a long period of time exhibited an increased cancer risk, he testified (N.T. 1472). If one accepts the Demers

results, it suggests that EMFs act as an initiator carcinogen rather than a promoter as other epidemiological information suggests (N.T. 1472).

Dr. Cole again testified as to ostensible weakening of associations as one moves from the Wertheimer results. He said that he has not seen an instance where an association got weaker and weaker over time in epidemiological data and still came to be accepted as valid. Dr. Cole did not deny the associations in the results (N.T. 1479).

The studies of men with breast cancer have been relatively few; research into the relationship between EMFs and male breast cancer has not really begun (N.T. 1490, 1491). Dr. Cole testified that his comments about the problematic aspect of Demers' results with respect to the general perception of EMFs as a possible promoter of cancer, are limited to findings referring to male breast cancer (N.T. 1493).

Dr. Cole testified that he holds statistical significance to be a relatively weak approach in the analysis of data (N.T. 1494).

When Dr. Cole speaks of "how much exposure," he is asking how high was a field, how long was exposure, and then getting an estimate from those factors (N.T. 1496). He classified the probability of initiation as a function of degree of cumulative exposure to the initiator (N.T. 1498). There is no

reason to exclude the potential for the intensity of a short-term exposure as being a relevant variable in determining the initiating ability of various substances that cause cancer. Nor is there reason to exclude as relevant dosage the number of times a subject is exposed or the rapidity of the exposures (N.T. 1511).

Dr. Cole feels strongly that EMFs have not been and are not likely to be shown to be carcinogenic in humans, but he does not claim that it is absolutely beyond the range of research (N.T. 1513).

Dr. Cole testified that, at present, the evidence is just about equally divided between that which is supportive and that which is contradictory. This fact leads him to say that is a pattern for associations that end up fading away (N.T. 1523).

C. Office of Consumer Advocate (OCA)

David E. Janes (OCA Statement No. 1 [Janes]; Exhibit DEJ-1; OCA Statement No. 1A [Janes]) testified, inter alia, that he is Vice President of Risk Analysis Corporation, located in McLean Virginia 22101; has over thirty years of experience in analyzing the effects and risks of exposure to ionizing and nonionizing radiation (OCA Statement No. 1 [Janes] at 1); that the purpose of his testimony was to explain the effect of power frequency fields upon biological systems; that EMFs produce demonstrable and measurable effects upon humans, animals,

cellular systems; that electric and magnetic fields of certain magnitudes, not commonly encountered in environmental exposures can be sensed by human beings tactilely and visually (Id. at 2); that weak electric and magnetic fields, i.e., those which are too small to affect the function of critical tissues such as the heart and central nervous system, also affect biological systems (Id. at 2).

The witness further testified that electric field strengths for typical 115 kV (double circuit) to 765 kV (single circuit) high voltage transmission lines range from 0.97 to 12 kilovolts per meter (kV/m) in the maximum field to 0.4 to 2.3 kV/m at the edge of a right of way (ROW) (Id. at 3 and Table 1); that PECO's 230 kV single circuit line will generate maximum ROW fields of 1.9 to 2.3 kV/m and edge of ROW fields of 1.2 to 1.3 kV/m (Id. at 3); that magnetic fields vary depending upon line current, which varies with transmitted power (Id.); that typical values range from 20 to 140 milligauss and maximum values probably do not exceed 350 milligauss (Id.); that for the PECO 230 kV line carrying a normal load, the Company has calculated the maximum ROW fields to be 42 milligauss and the edge of the ROW fields to be 25 milligauss (Id.).

The witness also testified that power frequency fields result in intensified electric fields at the outer surface of the body and weaker electric fields and currents inside the body, the

current densities varying with body shape and orientation to field direction (Id. at 3, 5); that the magnetic fields produced by power frequencies cause currents inside the body, but are not intensified at the surface; and that their magnitude is proportional to body size (Id. at 6).

The witness further stated that a large body of literature exists pertaining to biological effects of exposure to power frequency electric and magnetic fields (Id.); that both positive and negative results have been reported, and the witness cited examples of studies reported in journals which support the conclusion that effects occur in exposed animal and cellular systems (Id.; N.T. 396-397); that humans and animals can sense the presence of weak electric fields, but not weak magnetic fields; that a consistently observed effect of weak electric and magnetic fields is that they disrupt normal circadian rhythms, which are biological rhythms that repeat at approximately 24-hour intervals (Id. at 7-8).

Witness Janes also testified that exposure to 60 hertz electric fields suppresses nighttime concentrations of melatonin, the hormone which regulates sexual function and development, among other things, in the rat; that exposure to 60 hertz electric fields also affects the circadian rhythm of neurotransmitters (Id. at 8); that cellular studies have shown that exposure to EMFs affects the synthesis of ribonucleic acid,

and thus, protein synthesis (Id. at 7-8; N.T. 406-407); that magnetic fields also alter protein synthesis in tissue culture preparations of human cells (OCA Statement No. 1 [Janes] at 9); that exposure to 60 hertz fields has also been shown to affect ornithine decarboxylase (ODC), the controlling enzyme in cellular synthesis of polyamines (Id.); that based upon the data showing that EMF exposure is capable of increasing ODC activity, one researcher has stated that it is conceivable that exposure may promote tumor formation, a hypothesis with which the witness does not disagree (N.T. 410); that extremely low frequency magnetic fields have also been shown to affect cell proliferation (OCA Statement No. 1 [Janes] at 9); and that the mechanisms for the observed effects of weak electric and magnetic fields are not known, but some models have been suggested, although not experimentally established (Id.).

Mr. Janes concluded that weak electric and magnetic fields affect biological systems, but that the biophysical and biological mechanisms are either not known or poorly understood at this time; that the effects seen in cellular systems are useful for generating hypotheses, but cannot be directly extrapolated to animals; that the effects observed are subtle and often transient; that therefore, the connection between these effects and any harm to human health is unclear; that since weak field effects occur, the possibility of harmful effects cannot be

summarily or categorically rejected and concerns about harmful effects are legitimate (Id. at 10).

On cross-examination, the witness clarified that if exposure to EMFs does turn out to pose a health problem, high voltage transmission lines may not be the only source of concern; but he also stated that there may be a dose response where effects are related to intensity (N.T. 378-379).

On surrebuttal, Mr. Janes testified that additional research is needed to resolve present uncertainties about the role melatonin plays in carcinogenesis; that although the role of melatonin in human physiology is not understood, it is known that exposure to 60 hertz electric fields affects melatonin levels (OCA Statement No. 1A [Janes] at 1); that exposure to extremely low frequency electric and magnetic fields affects melatonin levels and it has been suggested that melatonin levels affect the incidence of chemically induced breast tumors in rats; and that it is important to establish by direct experiment whether EMF exposure impacts upon tumor incidence in rats, and then to determine whether such results have any implication for human health (OCA Statement No. 1A [Janes] at 2).

Dr. David Rosenbaum (OCA Statement No. 2 and OCA Statement No. 2A), President of Risk Analysis Corporation, whose qualifications are set forth in OCA Statement 2, Exhibit DMR-1, testified as to the current state of knowledge regarding the

effects of 60 hertz electro-magnetic fields on people and the subject of prudent decision-making in the face of uncertain risk and cost. He summarized the results of the Wertheimer and Leeper, Barregard, Tomenius, Savitz, Rodwall, McDowell, Fulton, Myers, Coleman, Severson and later Wertheimer and Leeper studies (OCA Statement No. 2 [Rosenbaum] at 4-5). He also testified as to the difficulty of proving a cause and effect relationship utilizing epidemiologic studies, and as to the confused picture presented by the studies summarized. He described the present state of knowledge about the effects of nonionizing radiation as very uncertain and compared it to the level of knowledge of ionizing radiation in the 1920's. He testified as to his familiarity with the present epidemiologic studies as to the associations between what may be surrogates for long-term average field strengths and various types of cancer (OCA Statement No. 2 [Rosenbaum] at 3).

He further stated that prudent policy requires continued research into the effects of electric and magnetic fields and the provision of information about the current research in EMF to the public, stressing the uncertainty and changeability thereof in an impartial manner. He emphasized that public involvement in the decision-making process is important, in advance of critical decisions being made, and stressed that the costs and effects of mitigative measures should be considered

before design and construction of a transmission line, which, he asserted, was not done in the case of the PECO 230 kV line (OCA Statement No. 2 [Rosenbaum] at 7). The witness explained that among mitigative measures which should be considered before construction begins are, inter alia, avoiding heavily populated areas, parks, schools and other public facilities; widening rights of way; using higher ground clearances, and designing the lines to reduce the fields (Id.). The witness believes that substantial reductions in field strength can be obtained at reasonable cost, and stated that in planning it is prudent to take measures to lower the public's exposure to magnetic fields if doing so is not too costly (OCA Statement No. 2 [Rosenbaum] at 8).

On cross-examination, Dr. Rosenbaum clarified the differences between ionizing versus non-ionizing radiation, stating that ionizing radiation removes electrons from atoms and molecules of biological cells (N.T. 302-306). Dr. Rosenbaum elaborated on the concepts of prudent avoidance as those which lead a utility to make fields lower for people in situations where they are likely to experience the field for a long time (N.T. 315). The witness also pointed out that the information regarding the ability to reduce EMF by 50% to 75% was taken from information received from Pennsylvania Power and Light, concerning its expectations of results on newly constructed

transmission lines (N.T. 353). He further testified that to fully develop a position on EMF, the Commission should consider both epidemiologic evidence and biological evidence (N.T. 362, 366).

On surrebuttal, Dr. Rosenbaum testified as to PECO witness Dr. Cole's use of the phrase "irregular statistically significant associations" or irregular associations, which, in his opinion, had no technical meaning in the context of evaluating the epidemiologic studies (OCA Statement No. 2A [Rosenbaum] at 1). As to Dr. Cole's point that the Savitz study reported weaker associations than those reported by Wertheimer, Dr. Rosenbaum pointed out that all of the studies showed an association between wiring code and childhood leukemia and further, that it is not necessarily so that a more carefully done study will achieve stronger results (Id. at 2). A more carefully done study may eliminate the results of bias, thereby getting weaker results, even in an instance where there is a real effect (Id.). Dr. Rosenbaum also took issue with Dr. Cole's assertion that Peters finding as to an association was weaker than that found by Savitz, noting that, on balance, one might call the two studies fairly comparable (Id. at 4).

IV. FINDINGS OF FACT

1. The Woodbourne-Heaton Line connects two substations, the Woodbourne substation in Middletown Township and

the Heaton substation in Upper Moreland Township, Pennsylvania (PECO Statement No. 1 [Oedemann] at 4).

2. The line is being built on an existing Conrail railroad right of way (PECO Statement No. 1 [Oedemann] at 4).

3. Conrail stopped using electric trains on this rail line in 1981. The electric line remained energized until 1986 and was used as part of the railroad's bulk power transmission system (N.T. 13). The Conrail electric 138 kV transmission line was de-energized in 1986 and the catenary wires were removed in 1986 (PECO Statement No. 1 [Oedemann] at 4). The 6,600 volt signal power feeder was de-energized in January 1991 (PECO Statement No. 1 [Oedemann] at 4).

4. The voltage on the Conrail electric line at the time it was energized was 132,000 volts (N.T. 10).

5. The new 230 kV line is located within a 60 foot easement purchased from Conrail which is located within Conrail's property lines (PECO Statement No. 1 [Oedemann] at 5).

6. The Conrail right-of-way is 60 feet wide with the transmission line located at its centerline with 30 feet to either side (N.T. 11).

7. The Woodbourne-Heaton Line will use 208 of the original Conrail transmission line 238 structures and will be supported on single poles with 3-phase conductors in the compact

triangular (delta) configuration (PECO Statement No. 1 [Oedemann] at 5).

8. The compact delta configuration was used because the existing structural spacing was appropriate for a compact delta configuration (PECO Statement No. 1 [Oedemann] at 6).

9. The proposed PECO transmission line is expected to cost approximately $19.8 million (PECO Statement No. 1 [Oedemann] at 7).

10. Using existing structures saved PECO customers approximately $2.5 million as compared to total replacement of the structures (PECO Statement No. 1 [Oedemann] at 6).

11. All 60 Hz electric devices, including power lines and household appliances, produce electric fields and magnetic fields (PECO Rebuttal Statement No. 6 [Silva] at 8).

12. Hertz (Hz) is a unit of frequency which relates to the number of alterations or cycles of a wave during a period of time. For a static field, the frequency is 0 Hz (PECO Rebuttal Statement No. 6 [Silva] at 9).

13. The term 60 Hz means 60 cycles per second. For alternating current (AC) electric power lines, the voltage and electric current reverse polarity, or direction, at a rate of 60 cycles per second (PECO Rebuttal Statement No. 6 [Silva] at 9).

14. The earth has a static or DC electric field of about 0.15 kV/m; static electric fields can also result from

taking off a sweater or walking across a carpet. Induced body voltages as high as 4,000 volts (4 kV) and 8,000 volts (8 kV) have been measured from walking across a carpet (PECO Rebuttal Statement No. 6 [Silva] at 8).

15. The earth has a static magnetic field and in southeastern Pennsylvania, the earth's magnetic field is about 560 milligauss (PECO Rebuttal Statement No. 6 [Silva] at 8-9).

16. Most environmental exposures to electric fields are less than 8 kilovolts per meter and environmental exposures to magnetic fields are less than 5,300 milligauss (OCA Statement No. 1 [Janes] at 3).

17. Electric fields are the fields associated with the voltage on the conductors of an electric power line or device. The fields decrease with distance from the source and are easily shielded by objects such as trees (PECO Rebuttal Statement No. 6 [Silva] at 9).

18. Electric fields are detectable by humans and animals in laboratory settings (OCA Statement No. 1 [Janes] at 6).

19. Electric and magnetic fields exist whenever electricity is present; power line, appliances and internal home and business wiring all generate EMF (PECO Statement No. 2 [Boeggeman] at 4-5).

20. Fields associated with electric transmission lines are sinusoidal in nature (PECO Rebuttal Statement No. 4 [Rosenberg] at 6, 16; N.T. 769-770).

21. Electromagnetic fields from electric transmission and distribution lines are non-ionizing because they have energies which are too small to produce ionization; the process by which fields of higher energy remove electrons from the atoms and molecules of biological cells and tissues (OCA Statement No. 2 [Rosenbaum] at 6).

22. Ionizing radiation is at the extremely high end of the electromagnetic spectrum and this type of field is capable of transmitting very large amounts of energy sufficient to break chemical bonds in the molecules of the cell. This type of radiation can kill or damage a cell (PECO Rebuttal Statement No. 4 [Rosenberg] at 10).

23. The energy in power frequency fields (60 Hz fields) is much less than one-trillionth of that found in ionizing radiation, which is not enough to break chemical bonds in the cells like ionizing radiation (PECO Rebuttal Statement No. 4 [Rosenberg] at 10).

24. People are exposed to appliances for a relatively short period of time while they are in use. People move from one activity to the next and from one location to another, each having their own sources of electric and magnetic fields. People

are exposed to a continuous or almost continuous range of exposures in a typical day (PECO Rebuttal Exhibit No. 6 at 12).

25. At 1.2 inches, a microwave oven generates magnetic fields from 750 to 2,000 milligauss; at 12 inches, the magnetic field drops to 40 to 80 milligauss and at 39 inches, the magnetic field is 3 to 8 milligauss. The magnetic field from an electric range at 1.2 inches is 60 to 2,000 milligauss; at 12 inches, 4 to 40 milligauss; and at 39 inches, 0.1 to 1 milligauss. For a hair dryer, the magnetic field at 1.2 inches is 60 to 20,000 milligauss; at 12 inches, 1 to 70 milligauss and at 39 inches, the field drops to 0.1 to 3 milligauss. For a television, the magnetic field at 1.2 inches is 25 to 500 milligauss; at 12 inches the field is 0.4 to 20 milligauss and at 39 inches is 0.1 to 2 milligauss (PECO Statement No. 1 [Oedemann] at 5).

26. "Phase rolls," an engineering technique to reduce the interference between transmission facilities and nearby communication facilities, were incorporated into the design of the line at various locations and will result in lower magnetic field exposure (PECO Statement No. 1 [Oedemann] at 6-7; PECO Rebuttal Statement No. 6 [Silva] at 17).

27. The electric fields expected to be generated by the Woodbourne-Heaton 230 kV line using the compact delta configuration would be 1.87 kV/M in the middle of the right-of-way; 1.2 kV/m at the edge of the right-of-way and continues to

decrease further away from the line; at 300 feet from the right-of-way centerline, the electric field is 0.013 kV/m (PECO Statement No. 1 [Oedemann] at 7).

28. Magnetic fields from the Woodbourne-Heaton 230 kV Line will be dependent on loading on the line:

(a) at emergency minimum loading when the line is de-energized for an emergency or maintenance reasons and expected current flow is 0 amperes, there is no magnetic field because there is no current on the line;

(b) at "light" loading where the expected current flow is 180 amperes, maximum magnetic field at the middle of the right-of-way would be 21 milligauss, and at the edge of the right-of-way would be 13 milligauss;

(c) at "normal" loading when the expected current flow is 360 amperes, maximum magnetic fields expected at the middle of the right-of-way is approximately 42 milligauss and at the edge of the right-of-way would be 25 milligauss;

(d) at "heavy" loading when the expected current is 600 amperes, the magnetic field at the middle of the right-of-way is expected to be 70 milligauss and at the edge of the right-of-way approximately 42 milligauss; and

(e) at the "emergency maximum" loading, conditions (where another transmission line in the PECO system would be de-energized because of emergency situation and the

expected current flow would be 1000 amperes), the maximum magnetic field at the middle of the right-of-way is expected to be 117 milligauss and at the edge of the right-of-way approximately 70 milligauss (PECO Statement No. 2 [Boeggeman] at 8-9).

29. "Light" and "normal" loading of the line would represent 90% of the expected loading on the line according to PECO's system planners (N.T. 71).

30. "Emergency maximum" loading on the line is not expected to exceed four hours per year (PECO Statement No. 2 [Boeggeman] at 8).

31. The Woodbourne-Heaton 230 kV Line has been designed and constructed and will be maintained in accordance with the National Electrical Safety Code (PECO Statement No. 1 [Oedemann] at 8).

32. The compact delta design used for the Woodbourne-Heaton 230 kV transmission line will result in the lowest levels of 60 Hz electric and magnetic fields levels that could be achieved on the existing right-of-way using technologically available designs for 230 kV transmission lines (PECO Statement No. 2 [Boeggeman] at 12-13).

33. The magnetic field levels that will be associated with the Woodbourne-Heaton 230 kV transmission line are within

the levels adopted by the State of New York in its magnetic field regulations (PECO Rebuttal Statement No. 6 [Silva] at 18).

34. The magnetic field levels that will be associated with the Woodbourne-Heaton 230 kV transmission line are within the levels adopted by the State of Florida in its magnetic field regulations (PECO Rebuttal Statement No. 6 [Silva] at 18).

35. The electric and magnetic field levels that will be associated with the Woodbourne-Heaton 230 kV transmission line are in the same range as electric and magnetic field levels from other 230 kV transmission lines in Pennsylvania and elsewhere in the United States (PECO Rebuttal Statement No. 6 [Silva] at 18).

36. There is not enough sufficient conclusive information to know whether very low frequency electromagnetic fields are dangerous to people and which of their characteristics might be dangerous (N.T. 360; PECO Rebuttal Statement No. 2 [Cole] at 28; PECO Rebuttal Statement No. 3 [Gelmann] at 23; PECO Rebuttal Statement No. 4 [Rosenberg] at 21).

37. Although biological effects are observed to be associated with EMF exposure, no connection between EMF exposure and human cancer has been conclusively demonstrated (N.T. 368; OCA Statement No. 1 [Janes] at 10).

38. A causal connection between the biological effects of electric and magnetic fields and harm to human health has not

been scientifically proven, nor has a causal connection been disproven (OCA Statement No. 1 [Janes] at 10).

39. Epidemiological studies are inconclusive, i.e., some show associations between surrogates for long-term average field strength and various types of cancer; sometimes there is no apparent correlation when actual measured (short-term) field strength is used instead of the surrogate; other studies have reported either no significant correlation or no relationship between fields or field surrogates and cancer; authors of one study have observed negative correlations between exposure to high magnetic fields and cancer; another study reports increased cancer, but low total death rates (due to less cardiovascular disease for those exposed to high fields); one study reports higher cancer incidence for people farther from a power line than for people closer to a power line (OCA Statement No. 2 [Rosenbaum] at 3; OCA Statement No. 2A [Rosenbaum] at 2; Protestants' Statement No. 1 [Turner] at 3-4; PECO Rebuttal Statement No. 2 [Cole] at 18).

40. Taken together, the epidemiologic reports are inconclusive with respect to an association/effect relationship between EMF and cancer among human beings. Therefore, to date, no demonstrated relationship between EMF and cancer in human beings is established (PECO Rebuttal Statement No. 2 [Cole] at

28; OCA Statement No. 2 [Rosenbaum] at 3-4, line 11 to p. 5, line 11).

41. The biophysical and biological mechanisms giving rise to the effects of EMF exposure are either not known or are poorly understood at the present time (OCA Statement No. 1 [Janes] at 10).

42. Effects of EMF observed through cellular studies cannot be directly extrapolated to animals (OCA Statement No. 1 [Janes] at 10).

43. The nature and extent of risks to human health posed by exposure to EMFs are uncertain (OCA Statement No. 2 [Rosenbaum] at 8).

44. Prior to construction, the Senior Engineer in charge of design and construction of the Woodbourne-Heaton Line did not consider EMF a safety issue to be considered (PECO Statement No. 1 [Oedemann] at 7-11; N.T. 35-36).

45. PECO did not conduct any calculations of the electric and magnetic fields resulting from its design choice until after the construction of the Woodbourne-Heaton Line was substantially completed (OCA Statement No. 2 [Rosenbaum] at 7; OCA Cross-Exh. 1; N.T. 12-13).

46. Taking into consideration the absence of promulgated electric and magnetic field line standards in the Commonwealth of Pennsylvania, the line design and routing of the

Woodbourne-Heaton Line are factually consistent with the concept of prudent avoidance on hindsight review (PECO Rebuttal Statement No. 6 [Silva] at 16-17; N.T. 315-316).

47. On hindsight review, the electric and magnetic field levels that will be associated with the Woodbourne-Heaton 230 kV transmission line are consistent with the "similarity-based" approach to the concept of prudent avoidance (PECO Rebuttal Statement No. 6 [Silva] at 18).

48. Prudent avoidance is a concept which was described by researchers at Carnegie-Mellon University in a 1989 report sponsored by the Congressional Office of Technology Assessment (OTA) and a brochure distributed by Carnegie-Mellon University (PECO Rebuttal Statement No. 6, [Silva] at 14).

49. The concept of prudent avoidance suggests modest efforts to reduce field exposure. Prudent avoidance is a concept that recognizes that a scientific determination cannot be made that changes in EMF levels will have any effect on health, and thus prudent avoidance advocates only a modest effort in making such changes (PECO Rebuttal Statement No. 6 [Silva] at 15-16, 18).

50. Mitigative measures that should be considered in practicing prudent avoidance may include: (a) avoiding heavily populated areas; (b) avoiding parks, schools and other public facilities; (c) widening rights-of-way; (d) limiting public use

of rights-of-way; (e) using higher ground clearances; and (f) designing the power lines to reduce fields (OCA Statement No. 2 [Rosenbaum] at 7).

51. One approach to prudent avoidance is known as the "similarity-based" approach where levels of EMF from specific transmission lines are kept similar to levels of EMF from other transmission lines in the same voltage category. This approach was used in New York and Florida (PECO Rebuttal Statement No. 6 [Silva] at 18).

52. The "similarity-based" approach recognizes the assumption that the aspect of EMF exposure which may be important in regard to health is not known (PECO Rebuttal Statement No. 6 [Silva] at 18).

53. Typical high voltage transmission lines have a maximum electric field strength on the right-of-way from approximately 1 to 12 km per meter and fields at the edge of the right-of-way from 0.3 to 3 kilovolts per meter (OCA Statement No. 1 [Janes] at 3).

54. Typical high voltage transmission lines have magnetic fields in the range of 20 to 140 milligauss and maximum values which do not exceed 350 milligauss (OCA Statement No. 1 [Janes] at 3).

55. The electric and magnetic fields that will be associated with the Woodbourne-Heaton Line are in the same levels

as other typical 230 kV transmission lines (PECO Rebuttal Statement No. 6 [Silva] at 19).

56. The line design is a compact delta (or triangular) configuration which produces lower fields than other typical configurations. Phase rolls used to mitigate induction effects on railroad tracks and Conrail communication systems will also result in lower magnetic fields (PECO Rebuttal Statement No. 6 [Silva] at 17).

57. The use of an existing utility corridor previously used for an electrified railroad and currently used by a diesel railroad avoids creation of a new utility corridor. As to cost, the near linear route and the re-use of existing Conrail electric structures which are conducive to the compact delta configuration for line design with phase rolls, are consistent with principles of prudent avoidance (PECO Rebuttal Statement No. 6 [Silva] at 16-17).

58. PECO provides its customers brochures advising them to consider actions which minimize or avoid exposure to EMF (N.T. 37).

59. Some of the recommendations in the brochure are: not to stand close to microwave ovens, dishwashers or television sets while they are turned on, move radios, answering machines and electric clocks so they are not close and keep video display terminals at least 18 inches away (N.T. 66-67; Prot. Exh. 1).

60. The adjoining landowners have fears about other aspects of living next to an energized transmission line, for example, poles falling onto their properties (N.T. 109).

61. Some of the adjoining landowners will utilize their properties differently or limit the use of their properties or move because of the proximity to an energized transmission line (N.T. 103-107, 110, 121, 133, 138, 145-146, 154, 162-163, 184-188, 189, 195, 200-201, 204, 206, 222-223, 234, 235, 245, 255-256, 261, 267, 277, 278-280, 439, 450-452, 469, 476, 483, 485-486, 489-491).

62. Some of the literature describing the philosophy of "prudent avoidance" states that people are to "avoid unnecessary exposure" to EMF (Protestants' Exh. 1; N.T. 123-124).

63. Some of the adjoining landowners do not believe that the rights of way are sufficiently wide to enable them to prudently avoid exposure to EMF (N.T. 180).

64. Protestants do not own property in the right-of-way of PECO's Woodbourne-Heaton 230 kV Line (N.T. 98, 130-131, 143, 151, 156, 160, 164, 165, 180, 188, 194, 196, 199, 219, 229, 238, 251, 258, 268, 438, 462, 466, 475, 482 and 488; PECO Statement No. 1 [Oedemann] at 5).

65. Protestants' property lines vary from a distance of 37 feet to in excess of 200 feet distance from the line, the closest measurement being at one corner of Protestant Matirko's

property (N.T. 98, 130-131, 143, 151, 180, 196, 199, 219, 229, 238, 251, 270, 438, 488).

66. The majority of the Protestants who testified about the length of time they owned their properties have owned their properties for more than four years. Protestant Glathorn owned her property for the longest period of time -- 19 years (N.T. 139-140, 164, 165, 186, 209, 222, 237, 263, 438).

67. The majority of Protestants have garnered their information about EMF and adverse health effects from television news reports, newspapers, magazine articles and literature distributed by PAUSE (N.T. 111-112, 125, 139, 147, 162, 166, 173, 222, 260, 441, 483, 490, 494).

68. PAUSE has not distributed any literature to Protestants which does not state that there is not a health risk, or a slight health risk associated with EMF (N.T. 495).

69. Protestants have concerns and fears about EMF from the line causing adverse health effects to themselves and their families (N.T. 103, 126, 139, 155, 167, 184-185, 201-203, 234, 253, 260, 265, 274, 440, 447, 471, 484, 490). These concerns and fears are reasonable by reason of the scientific uncertainty (OCA Statement No. 1 [Janes] at 10).

70. Protestants indicate that because of their concerns about EMF and health effects, they practice prudent avoidance in their homes by changing the location of alarm clocks

and television sets and the manner in which they use appliances to reduce EMF exposure (N.T. 139-141, 148, 162, 197, 204, 217, 234, 244, 278, 446, 471, 476, 489).

71. The named Protestant Robert Small's property is adjacent to the Conrail right-of-way and the transmission line is 45 to 50 feet from his property line (N.T. 270).

72. The named Protestant Robert Small does not own any property in the right-of-way of PECO's Woodbourne-Heaton 230 kV Line (N.T. 270).

73. Trees on Robert Small's property were mistakenly removed by crews clearing the right-of-way for the PECO line (N.T. 271, 282-283). By way of compensation for the lost trees, PECO came to an agreement with Robert Small's wife, Jill, whereby PECO's work crew took down two or three dead trees in the Small's backyard and cut the wood into fireplace-size pieces (N.T. 282-284, 286-289; PECO's Cross Examination Exhibit No. 1).

74. Additional research in the field of EMFs and human health effects is needed.

V. DISCUSSION

At the outset, it must be again noted that in its Order adopted February 9, 1990, at page 3, which was reiterated in its Order adopted March 6, 1991, at page 11, the Commission noted that the Woodbourne-Heaton line ". . . would be designed, constructed and maintained in accordance with the National Safety

Code and that minimum standards would be met or exceeded." However, in its direct case in the instant proceeding, PECO also presented testimony that the line had been designed and would be operated in accordance with the National Electrical Safety Code (PECO Statement No. 1 [Oedemann] at 8-9). In addition, modifications were made to the line's location and structural design to minimize interference with aviation activities at Buehl Air Field (PECO Statement No. 1 [Oedemann] at 10). The record further discloses that the design selected for the line was the compact delta configuration which would produce lower levels of EMFs than other line configurations and that phase rolls were incorporated into the design to reduce interference with Conrail's communication system (PECO Statement No. 1 at [Oedemann] 6-7; N.T. 11). These phase rolls also reduce EMFs generated by the line (PECO Rebuttal Statement No. 6 [Silva] at 17). There was no convincing evidence of record to refute any of the foregoing.

Protestants, however, have raised the issue that exposure to electromagnetic fields may have adverse human health effects; and, as aforesaid, the Commonwealth Court and the Commission have afforded Protestants in this proceeding an opportunity to be heard on this issue.

The following discussion concerning various scientific studies and the analyses thereof by the various parties is not

intended as a definitive scientific treatise surveying the entire field of research on the EMF issue, but is an overview of the material that has been presented of record in this case. Again, it is not presented so that a scientific conclusion can be drawn on the merits of the studies presented, but rather to determine whether the record in this case, taken as a whole, can support a finding of adverse human health effects from exposure to EMFs.

Of necessity, there may be some repetition in the following discussion because neither PP&L nor the Prosecutory Staff presented witnesses of their own, but instead, relied principally upon the testimony of the PECO witnesses and in part upon the OCA witnesses and quoted extensively therefrom. Therefore, in order to afford the Commission a comprehensive presentation of the positions of all of the parties, and the reasons therefor, reiteration of some testimony became necessary.

At the hearings, Protestants presented the testimony of Dr. Abraham A. Liboff, a Professor of Physics at Oakland University, Oakland County, Michigan. In his opinion, there is a hazard to humans from power frequency magnetic fields (Protestants' Statement No. 2 [Liboff] at 5). The record indicates that his opinion was based in part on epidemiological studies (Protestants' Statement No. 2 [Liboff] at 3; N.T. 777); and in part on laboratory experiments; i.e., altered cell responses and bone repair studies (Protestants' Statement No. 2

[Liboff] at 3; N.T. 778). Further, Dr. Liboff posited that his opinion was supported by his Ion Cyclotron Resonance Hypothesis (Protestants' Statement No. 2 [Liboff] at 5-6; N.T. 780-84).

Dr. Liboff testified concerning research on cellular biology (Protestants' Statement No. 2 [Liboff] at 2), endocrinology (Protestants' Statement No. 2 [Liboff] at 4-5), reproduction (Protestants' Statement No. 2 [Liboff] at 3), immunology (Protestants' Statement No. 2 [Liboff] at 2), and epidemiology (Protestants' Statement No. 2 [Liboff] at 3-4). He pointed out that in the 1960's, it was known that weak electrical currents could influence repair mechanisms in hard and soft tissues; and that electromagnetic procedures developed along these lines have become recognized clinical techniques for treating certain types of bone problems. Nevertheless, he stated, there is still no reasonable explanation to explain the efficacy of such procedures because the power input of these signals is simply too small to invoke any conceivable physical mechanism. He further explained that the fact that this phenomenon cannot be explained using simple physical law, does not imply that the physical law is being violated. What it means, according to him, is that biological systems contain receptors or sensors designed to recognize these small signals. Dr. Liboff further concluded, on the basis of his research at the Naval Medical Research Institute in Bethesda, Maryland, that

human cells exposed to very weak ELF magnetic fields change in a definite way, i.e., they consistently exhibit an increase in DNA synthesis over cells not exposed. However, he admitted that the observed cellular effects have proven extremely difficult to model. Dr. Liboff further testified that Marron et al showed that such fields can affect cell cycle; that Goodman et al showed that protein synthesis is affected; and that Bawin et al found that calcium efflux from brain tissue is enhanced. Dr. Liboff also believes that the epidemiological results linking human cancer to power line exposures becomes much stronger when placed in context, such that it is viewed as merely one component of a much larger body of work, all sharing the common characteristic of ELF-induced biologic change. He asserted that there are three lines of independent evidence that must be regarded as connected: (a) bone repair studies; (b) altered cell responses; and (c) epidemiological cancer studies. He further stated that although each involves a different type of biological response, each also involves a response to weak, low-frequency magnetic fields, fields that are asserted to be at energies less than any conceivable threshold, and that it would be a remarkable coincidence to have three totally independent research areas exhibit striking effects only when weak, low-frequency signals are used. Thus, to Dr. Liboff, it seems clear that the weak

field interaction is the common thread running through these separate research areas.

Dr. Liboff also discussed the work of Dr. Nancy Wertheimer, whose original publication in 1979 led to other epidemiological work on cancer, and who performed a second important study on the use of electric blankets during pregnancy, and concluded that the use of such blankets in the first trimester could lead to problems. He further stated that some supporting parallel evidence has been published indicating that embryological changes occur in both chick eggs and in fish eggs following exposure to weak ELF magnetic fields. Dr. Liboff then referred to the results of Dr. Bary Wilson indicating endocrine changes connected to the pineal gland in animal and human following electromagnetic exposure. He stated that the possibility exists that one of the pathways affected may result in breast cancer, but there is, in addition, a potential explanation in Dr. Wilson's work for the numerous anecdotal reports mainly in the Eastern bloc nations over the last few decades, classified as neurasthenic episodes for individuals exposed to power lines and other electric sources. Dr. Liboff continued and stated that more recently, Graham and Cohen have reported evidence of changes in human heartbeat in a group of men exposed to 60 Hz magnetic fields for short periods of time; and that Dr. Russell Reiter, of the University of Texas, looking at

the magnetically-induced changes in melatonin output by the pineal gland, has asserted that at least some sleep disorders should be regarded as caused by the electromagnetic environment. Thus, Dr. Liboff expressed his belief that biological systems are affected by weak, extremely low-frequency magnetic fields and that there is a hazard to humans.

Next, Dr. Liboff explained that in 1984, he hypothesized a mechanism to explain the ELF interaction, at least the physical part of the interaction, which he calls Ion Cyclotron Resonance (ICR). What was proposed then, and what Dr. Liboff believes today, is that the effects that are observed as a result of exposure to 60 Hz magnetic fields are functionally dependent upon the local dc magnetic field, that is the local geomagnetic field. He stated that specific combinations of ac and dc magnetic fields can act to put different biological ions such as calcium, potassium and magnesium into resonant states and thereby influence their transport into and out of the cell. He has since carried out many other experiments designed around this ICR hypothesis, in diatoms, in human lymphocytes, in embryonic chick, in rabbits, in yeast, and in bacteria and although most of these have been successful, there have been a few negative results.

Dr. Liboff also pointed out that another noteworthy area in connection with ion cyclotron resonance involved his work

on exposing human lymphocytes to calcium-tuned magnetic fields, which resulted in changes in calcium uptake. Finally, Dr. Liboff testified that less than a year ago he began a new series of experiments aimed at examining the effects of weak ELF resonance exposures on human cancer cell lines, notably human lymphoma, which was a more complete follow-up of earlier, unpublished work. At that time (about 1983), it was found that mouse myeloma and lymphoma cells indicated extraordinarily high rates of proliferation in ELF magnetic fields. His most recent results on human lymphoma cells, to be presented at the Department of Energy contractors meeting in November of 1991, reaffirm these results, but also find that the degree of proliferation in 60 Hz magnetic fields is closely dependent on the local geomagnetic intensity, rising and falling sharply in the vicinity of certain cyclotron resonance points. Accordingly, Dr. Liboff stated that he is reasonably certain that human cancer cells, at least in vitro, can show significant progression following exposure to weak 60 Hz magnetic fields at specific geomagnetic resonance values.

The Philadelphia Electric Company (PECO) takes sharp issue with Dr. Liboff's analysis and points out that although one basis for Dr. Liboff's "hazard" opinion was laboratory research showing "altered cell responses," Dr. Liboff indicated that these studies, by themselves, cannot establish a health hazard (N.T. 845). As to Dr. Liboff's assertion that the epidemiological

results prove a hazard because there is a "common thread," i.e., power frequency fields between the bodies of research (Protestants' Statement No. 2 [Liboff] at 4), PECO argues that the research relied upon by Dr. Liboff demonstrates that no such "common thread" exists, because pulsed fields and microwaves are very different from the power frequency fields which will be associated with the Woodbourne-Heaton Line (PECO Rebuttal Statement No. 4 [Rosenberg] at 16). Moreover, PECO points out that even Dr. Liboff admitted that it would be "premature" to say that pulsed fields and sinusoidal fields interact with biological tissue in the same way (N.T. 775-76). Thus, PECO casts scientific doubt on the conclusions reached by Dr. Liboff because of his reliance upon studies that used fields different from those which will emanate from the line, i.e., bone healing studies (pulsed) [PECO Rebuttal Statement No. 3 [Gelmann] at 19]; Takahashi on DNA synthesis (pulsed) [N.T. 807]; Delgado and Leal's chick embryo studies (pulsed) [PECO Rebuttal Statement No. 1 [Bockman] at 19]; the Henhouse studies [pulsed] (N.T. 826-27); calcium efflux [microwaves] (PECO Rebuttal Statement No. 3 [Gelmann] at 12). Accordingly, PECO argues that Dr. Liboff's opinion of a health hazard was based on studies that have nothing to do with the fields that will be associated with the line (PECO Main Brief at 28-29).

PECO next asserts that no mechanism of interaction between magnetic fields and biological tissue has been established, citing PECO witness Rosenberg's statement that the models for such mechanisms are "highly speculative at best" (PECO Rebuttal Statement No. 4 [Rosenberg] at 21); and OCA witness Janes' statement that the models that have been offered to explain a mechanism are "speculative" (OCA Statement No. 1 [Janes] at 9). Moreover, PECO points to Dr. Liboff's own testimony that

> The power input of these signals is simply too small to invoke any conceivable mechanism (N.T. 781).

(PECO Main Brief at 29)

PECO emphasizes that although Dr. Liboff believes that his ion cyclotron resonance (ICR) hypothesis[2] will provide such a mechanism, there have been numerous attempts to establish ICR through experiments (Protestants' Statement No. 2 [Liboff] at 5-6; N.T. 785-789, 906-914), which have failed to establish that ICR actually occurs in biological tissue (PECO Rebuttal Statement No. 4 [Rosenberg] at 20). PECO also criticizes the Liboff hypothesis on the additional ground that ions in human cells pass through submicroscopic channels in the cell wall, but for ICR to

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2 The ICR hypothesis deals with the question of how certain biological "ions" move through channels in cell membranes, and whether that process can be affected by magnetic fields (PECO Rebuttal St. 4 at 17).

work, the channels in the cell walls would have to be almost ten feet wide (PECO Rebuttal Statement No. 4 [Rosenberg] at 18).

PECO next responds to Dr. Liboff's assertion that exposure to EMF causes certain endocrine changes (Protestants' Statement No. 2 [Liboff] at 5), i.e., in calcium "efflux" (Protestants' Statement No. 2 [Liboff] at 2), in human reproduction and development (Protestants' Statement No. 2 [Liboff] at 4), and in levels of the hormone "melatonin" (Protestants' Statement No. 2 [Liboff] at 5). However, argues PECO, the calcium efflux studies[3] used modulated microwave fields different from those which will be associated with the Woodbourne-Heaton Line, and the power frequency fields such as those from the Woodbourne-Heaton Line, cannot interact with living systems in ways that are similar to microwaves (PECO Rebuttal Statement No. 4 [Rosenberg] at 13). In addition, PECO asserts that due to inconsistent and contradictory results from different laboratories, there is doubt whether the calcium "efflux" effects reported in the modulated microwave studies are a real effect of exposure to those fields (PECO Rebuttal Statement No. 1 [Bockman] at 12; PECO Rebuttal Statement No. 3 [Gelmann] at 18; PECO Rebuttal Statement No. 4 [Rosenberg] at 20). Significantly, however, Dr. Liboff agreed that the results

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[3] Researchers measured the amount of radioactive calcium released from slices of chick brain (Protestants' St. 2 at 2, 5; N.T. 801-03; PECO Main Brief at 31).

of the studies have been inconsistent, i.e., some showing an increase in calcium efflux, some a decrease, and in others, no effect at all (N.T. 764-65). Moreover, PECO stresses that even Dr. Liboff admitted that he could not make any extrapolation from the calcium efflux studies to human health (N.T. 805). Further, PECO adds, an extensive body of 60 Hz research looking at key calcium parameters in intact animals and using techniques capable of measuring the flow of individual calcium ions across cell membranes, indicate that such fields do not affect calcium metabolism in living organisms (PECO Rebuttal Statement No. 1 [Bockman] at 12-13).

To Dr. Liboff's assertion that adverse effects on human reproduction from exposure to EMFs are an area of possible concern (Protestants' Statement No. 2 [Liboff] at 4), PECO points out that Dr. Liboff relied upon only one epidemiology study (Wertheimer and Leeper) and parallel evidence from chicken egg and fish egg studies (N.T. 755). However, PECO witness Bockman explained that human reproduction depends upon precise coordination of a sequence of endocrine events (PECO Rebuttal Statement No. 1 [Bockman] at 18-19). Witness Bockman further explained that when expert scientific review panels evaluated the Wertheimer and Leeper study, they found it subject to severe criticism on many grounds and concluded that the claims of Wertheimer and Leeper do not appear justified (PECO Rebuttal

Statement No. 1 [Bockman] at 20). PECO also argues that the more recent epidemiological work by researchers at the National Institute of Health and the American Cancer Society reported no increase in the risk of adverse reproduction effects after exposure to EMF (PECO Rebuttal Statement No. 1 [Bockman] at 21). Moreover, as to the parallel evidence relied upon by Dr. Liboff, PECO asserts that it did not involve 60 Hz fields, but used pulsed fields (N.T. 826-29); and that extensive chick embryo studies conducted using actual 60 Hz fields found that exposure to power frequency fields did not affect any of the reproduction and development endpoints studied (PECO Rebuttal Statement No. 1 [Bockman] at 20). Additionally, the record testimony of the PECO witness also indicates that extensive animal research on whether EMF exposure has adverse reproductive effects shows no effects on fertility, fecundity, impregnation, fetal weight, fetal malformation, fetal growth, or any of numerous other reproduction and development endpoints (PECO Rebuttal Statement No. 1 [Bockman] at 19).

To Dr. Liboff's claim that exposure to EMF can cause changes in the hormone "melatonin" (Protestants' Statement No. 2 [Liboff] at 4-5), the PECO witness asserts that the melatonin research should be understood as one part of the larger question of whether EMF affects biological rhythms (PECO Rebuttal Statement No. 1 [Bockman] at 17) and further, that research

concerning EMF and body temperature, eating patterns, sleep/wake cycle, and biologically important hormones indicates that none of these rhythms has been shown to be altered by EMF exposure (PECO Rebuttal Statement No. 1 [Bockman] at 16).

The record further discloses that PECO witness Bockman explained that the hormone melatonin, produced in the pineal gland, is biologically active in rats and some other animals (PECO Rebuttal Statement No. 1 [Bockman] at 17); and that the EMF melatonin research has primarily involved rats, although a few studies have been done on other species. However, PECO argues that in applying the melatonin results to humans, Dr. Liboff has assumed that melatonin plays the same role in human physiology as in rat physiology (N.T. 832), which assumption is incorrect because the pineal gland has no known function in human beings (PECO Rebuttal Statement No. 1 [Bockman] at 17). Moreover, explains the PECO witness, there are no known biologic consequences of reported changes in melatonin and that the changes in melatonin cycle are not associated with changes in important biological rhythms (PECO Rebuttal Statement No. 1 [Bockman] at 18).

As to Dr. Liboff's claim that certain <u>in vitro</u> research on lymphocytes demonstrated physiological effects of exposure to EMF, PECO points out that Dr. Liboff did not express an opinion as to whether exposure to EMF adversely affects the immune system

(Protestants' Statement No. 2 [Liboff] at 6). The PECO witness testified that the body of immune research, including whole animal immune studies, indicates no deficit in the immune systems of the animals studied and, based on those studies, that exposure to moderate or even strong electric and magnetic field levels does not affect the host's immune system (PECO Rebuttal Statement No. 1 [Bockman] at 25).

The record further discloses that PECO addressed Dr. Liboff's claim that exposure to EMF is linked to cancer and pointed out that Dr. Liboff's opinion was based upon bone healing studies, cellular level research and epidemiological research (Protestants' Statement No. 2 [Liboff] at 4).

With respect to the cellular research, upon which Dr. Liboff based his opinion, PECO witness Gelmann explained the molecular and cellular processes involved in the process of carcinogenesis, as follows:

> The cell is the basic building block of the human body. Cells make up all the systems of the body, including the muscular skeletal, nervous, and circulatory systems. Within the cell is the nucleus, and within the nucleus are the chromosomes. The chromosomes contain the cell's DNA. DNA encodes the genetic information which provides a blueprint for all inherited characteristics. Genetic information is contained in discrete subunits of the DNA known as genes; for this reason, DNA is called the "genetic material."
>
> DNA contains the essential information coding for all the cell's structural and functional elements. Change in the DNA molecule, i.e.

> genetic change, can have serious effects on cell processes and therefore on tissues and organisms. Subtle change in the DNA molecule can be responsible for making a normal cell become a cancer cell. DNA change is associated with all cancers. Cancer cannot occur without permanent changes to the cell's DNA known as "mutations."

(PECO Rebuttal Statement No. 3 [Bockman] at 6)

Witness Gelmann then explained that the body of standard laboratory tests used to evaluate whether an agent affects molecular and cellular processes established that:

(a) Power frequency fields do not cause DNA mutations (PECO Rebuttal Statement No. 3 [Gelmann] at 9).

(b) Power frequency fields do not affect DNA repair processes (Id. at 10).

(c) Power frequency fields do not cause damage to chromosomes (Id. at 11).

(d) Intact animals exposed to power frequency fields do not exhibit abnormalities in functions such as reproduction, growth, or development, that would be affected by genetic change (Id. at 14).

(e) When animals with cancer are exposed to power frequency fields, there is no effect on the development of the tumor (Id. at 15).

Further, PECO asserts that Dr. Liboff completely ignored this research in reaching his conclusion.

In connection with Dr. Liboff's reliance upon cellular research and bone therapy research to support his conclusion that EMF is related to cancer, PECO witness Gelmann analyzed each of the cellular level and bone healing studies relied upon by Dr. Liboff, and stated that the processes being studied in each of those studies are not relevant to an examination of carcinogenic potential (PECO Rebuttal Statement No. 3 [Gelmann] at 21).

With respect to Dr. Liboff's reliance on the Wertheimer and Leeper study (1979) and on the Savitz study (1988) for his conclusion that there are correlations between EMF and childhood cancer (Protestants' Statement No. 2 [Liboff] at 3), the record discloses that PECO witness Cole discussed the six epidemiology studies published relevant to childhood cancer and EMF, i.e., Wertheimer and Leeper (1979), Savitz (1987, 1988), Fulton (1980), Tomenius (1986), Myers (1988) and London & Peters (1991) (PECO Rebuttal Statement No. 2 [Cole] at 12).

As to the Wertheimer and Leeper study, the PECO witness stated that it did not report that exposure to magnetic fields is associated with childhood cancer, and in fact, the study did not even collect data on magnetic fields. Instead, it reported higher rates of childhood leukemia in homes near certain types of electric distribution wire (PECO Rebuttal Statement No. 2 [Cole] at 12-13). However, witness Cole asserted, the Savitz study is "consistent with nullness - that is, a lack of effect of exposure

to magnetic fields" (PECO Rebuttal Statement No. 2 [Cole] at 16). The PECO witness pointed out that Savitz collected data on wiring codes and found a few irregular statistically significant associations with childhood cancer, but the Savitz data on actual magnetic field levels in the homes disclosed no association with EMF and childhood cancer (PECO Rebuttal Statement No. 2 [Cole] at 16).

Moreover, PECO witness Cole further pointed out that in the study by Tomenius (1986), an inverse trend between measured magnetic fields and cancer was reported, and an inverse trend between distance from electrical installations and childhood cancer (PECO Rebuttal Statement No. 2 [Cole] at 15). The witness also reviewed the negative studies by Fulton (1980) and Myers (1988) (PECO Rebuttal Statement No. 2 [Cole] at 14), and the Peters study (1991) which contain data on actual measured magnetic fields, and which found no association between measured magnetic fields and cancer, but reported a weak association between the wiring code and childhood leukemia (PECO Rebuttal Statement No. 2 [Cole] at 18).

Another point of disagreement between the expert testimony at the hearing arose in connection with witness Cole's opinion that as the quality of the childhood cancer studies has increased, the reported associations with wiring code have become weaker and weaker which, he opined, suggests that there is no

true association between EMF and cancer (PECO Rebuttal Statement No. 2 [Cole] at 19). When OCA witness Rosenbaum claimed that the Peters study had a higher odds ratio than the Savitz study (OCA Statement No. 2A [Rosenbaum] at 3), PECO countered that when the comparable categories were compared at the hearing, the calculations indicated that Peters actually had reported a smaller odds ratio than Savitz [N.T. 1409; PECO Cross-Examination Exh. 5(a)].

PECO further argues that although Dr. Liboff did not mention any epidemiology studies of adult cancer, PECO witness Cole discussed more than 40 adult cancer studies (PECO Rebuttal Statement No. 2 [Cole] at 23-27) and concluded that the studies involving power frequency electric and/or magnetic fields and cancer show weakly positive to zero or negative association (PECO Rebuttal Statement No. 2 [Cole] at 28).

Finally, PECO argues that of the approximate 50 epidemiology studies which contain data on EMF and cancer, Dr. Liboff based his opinions on only 9-10 of them (N.T. 859), of which he had only actually read two or three (N.T. 660); and that Dr. Rosenbaum reviewed only approximately 12 (OCA Statement No. 2 [Rosenbaum] at 3-5). Thus, PECO asserts that the entire body of epidemiological research fails to demonstrate any strong or consistent pattern of association between EMF and cancer among human beings.

The Pennsylvania Power & Light Company (PP&L), which did not present any witnesses of its own, essentially relies on the PECO testimony to support its position. Specifically, it points to PECO witness Cole's record conclusion that the epidemiology provides no persuasive scientific support for the hypothesis that EMFs cause cancer in children (PP&L Main Brief at 12). Thus, PP&L quotes witness Cole as follows:

> Looking at the childhood cancer studies as a whole and recognizing the degree of validity of individual studies within that group, I conclude that there is no demonstrated increased risk of childhood cancer when actual electric or magnetic fields were measured. When surrogates such as the wiring code have been used in the childhood studies, the data have shown a pattern of mixed results between weak positive and negative outcomes. This is a pattern of random association in a non-experimental science, not the pattern of cause and effect. Long term time trends of EMF exposure and leukemia in children in this country are not consistent with a cause-effect relationship. Finally, neither theoretical considerations nor animal studies are available to support a cause-effect hypothesis. I conclude that the epidemiologic literature on EMF, when viewed as a whole, provides no persuasive scientific support for the hypothesis that EMF causes cancer in children (PECO Rebuttal St. 2 at 20-21).

(PP&L Main Brief at 12-13)

PP&L also discusses PECO witness Cole's review of the epidemiological studies in EMFs and adult cancers, where he reached a similar conclusion, i.e., that the epidemiological data do not support a hypothesis that EMFs are associated with adult

cancer, and indeed, he asserts, provide support against any such hypothesis. Thus, PP&L quotes witness Cole as follows:

> The studies involving power frequency electric and/or magnetic fields and cancer show weakly positive to zero or negative associations. The studies that use the most acceptable design consistently have found no association between EMF and cancer. I conclude that this body of studies does not support the hypothesis that EMF is associated with adult cancer, and that the best-designed and conducted studies provide strong support against that hypothesis (PECO Rebuttal St. 2 at 28).

(PP&L Main Brief at 12-13)

Further, PP&L discusses PECO witness Cole's comments concerning the draft EPA report on EMFs and cancer, Environmental Protection Agency (EPA), Evaluation of the Potential Carcinogenicity of Electromagnetic Fields: Review Draft, Office of Research and Development EPA/600/6-90-005B, Washington, D.C., October 1990; and sets forth the various criticisms pointed out by witness Cole of the draft document, i.e., that available information is insufficient to conclude that electric and magnetic fields are carcinogenic; that the EPA document has serious flaws and needs to be rewritten; that all reviewers agreed that the human epidemiologic data to date do not support the sweeping conclusions made in the EPA document (PECO Rebuttal Statement No. 2 [Cole] at 22; PP&L Main Brief at 14).

Finally, PP&L again quotes the PECO witness as follows:

> Taken together, the epidemiologic reports fail to demonstrate any strong or consistent pattern of association between EMF and cancer among human beings. Indeed, even among the positive studies, findings are not supported by the internal characteristics of the data. The summation can only be that, to date, there is no demonstrated relationship between EMF and cancer in human beings. Id. at p. 28.

(PP&L Main Brief at 15)

PP&L then proceeds with a critical analysis of Dr. Liboff's testimony and asserts that his only examination of actual epidemiological evidence concerns criticisms that numerous scientists have voiced regarding epidemiologic data (PP&L Main Brief at 15, citing Protestants' Statement No. 2 [Liboff] at 3). PP&L contends that Dr. Liboff does not have the experience or training to assess epidemiological studies (PP&L Main Brief at 15) and that he is incorrect in asserting that each new epidemiologic report strengthens the one before it (Id. at 16). Indeed, argues PP&L, reported associations between wire code (a surrogate for magnetic field exposure) and cancer have weakened and there has never been a statistically significant association reported between measured fields and cancer (Id. at 16, citing PECO Rebuttal Statement No. 2 [Cole] at 17; N.T. 1479-80). Moreover, argues PP&L, Dr. Liboff discounts the possibility that confounding factors or random association could be the cause of reported association between surrogates for EMF and cancer (PP&L

Main Brief at 16-17, citing PECO Rebuttal Statement No. 2 [Cole] at 11-12 and N.T. 16).

With respect to laboratory evidence, PP&L refers to PECO Rebuttal Statements 1 and 3 (PP&L Main Brief at 17) and argues that PECO witness Bockman, who conducted an independent review of the scientific literature related to extremely low frequency (ELF) electric and magnetic fields as they relate to endocrinology and immunology to determine whether EMFs cause adverse effects on human endocrine or immune system functions, concluded that

> . . . the research indicates that exposure to EMF can cause subtle, transient biological changes in the neuroendocrine system. These biological changes are consistent with a normal perception or recognition response and do not indicate that exposure to EMF is harmful (PECO Rebuttal St. 1 at 14).

and with respect to the endocrine gland function, that

> Even with prolonged exposure to significant electric and magnetic fields, these hormones are not elevated in the blood and the data indicate that animals are not stressed by these fields (PECO Rebuttal St. 1 at 15).

and regarding biological rhythms, that

> Substantial research has been conducted regarding EMF and major biological rhythms, such as the rhythm in body temperature, eating patterns, sleep/wake cycle, (Ehret et al. 1980) and hormones such as prolactin and growth hormone. (Quinlan et al. 1985). None of these major biologic rhythms was shown to be altered by exposure to EMF (PECO Rebuttal St. 1 at 16).

(PP&L Main Brief at 20)

Further, PP&L notes that PECO witness Bockman concluded that results of research on changes in the circadian rhythm of certain neurotransmitters, ". . . do not indicate a harmful effect on biological rhythms" (PP&L Main Brief at 20-21, citing PECO Rebuttal Statement No. 1 [Bockman] at 16). In addition, PP&L stresses PECO witness Bockman's conclusion concerning the research on the circadian rhythm of the hormone melatonin in rats, as follows:

> There are no known or reported biologic consequences of the reported change in dark cycle melatonin levels, either in rats or humans. Nor is there evidence of any effect of EMF on any other major biologic rhythm or any other hormone. It is important to reiterate that these effects on the melatonin rhythms are not associated with changes in other major biologic rhythms such as sleep/wake cycles, body temperature, eating patterns, or the circadian release of other hormones. Also, it should be noted that the reported changes in dark cycle melatonin levels are limited to rats exposed to electric fields, not magnetic fields. In addition, when human subjects were studied, there was no reported decrease in pineal melatonin levels. Consequently, it cannot be said that the rat melatonin study provides a basis for concluding that power frequency electric or magnetic fields leads to adverse effects on human biologic rhythms (PECO Rebuttal St. 1 at 10).

and that research into reproduction and development reflects that

> The issue of EMF effects on reproduction and development has been examined extensively and there is no persuasive scientific evidence that exposure to power frequency fields has any adverse effects on reproduction,

> development, or related endocrine function (PECO Rebuttal St. 1 at 21).

(PP&L Main Brief at 21)

and relating to the immune system, that

> The comprehensive animal studies indicate that exposure of intact animals to EMF similar to those experienced under AC power lines produces no obvious deficit in immune cell function. With the exception of Odinstov's early unconfirmed study using L. monocytogenes, there is no evidence that exposure to moderate or even strong power frequency electric and magnetic fields adversely affects the host's immune system (PECO Rebuttal St. 1 at 25).

(PP&L Main Brief at 21)

PP&L also reviewed PECO's testimony with respect to molecular and cellular biology as presented in PECO Rebuttal Statement 3 at 5, and points out that PECO witness Gelmann concluded as to numerous mutational analyses (tests showing whether permanent change, also known as mutation, has occurred in the structure of the DNA molecule as a result of exposure to an agent) and as to chromosome studies [which evaluate whether there are breaks or other damage to chromosomes (which contain DNA) as a result of exposure to an agent] that

> Mutational analyses and chromosome studies provide specific information on molecular and cellular events that are associated with cancer and other adverse health effects. The EMF research in those areas shows no DNA change or other cellular or molecular changes that could lead to cancer or other adverse health effects (PECO Rebuttal St. 3 at 12).

(PP&L Main Brief at 25)

PP&L then comments on PECO witness Gelmann's conclusions with respect to animal studies (looking for the effects of agents on whole organisms) and quotes the witness, as follows:

> Long-term animal studies using multiple species, strains, and sexes or organisms consistently provide no scientific basis to conclude that electric and/or magnetic fields cause cancer, adverse effects on reproduction, growth, or development, or other adverse health effects (PECO Rebuttal St. 3 at 14).

(PP&L Main Brief at 25)

Next, PP&L comments on PECO witness Gelmann's conclusion regarding tumor growth studies (which are relevant to some cancerous properties of cells), and quotes the witness, as follows:

> The tumor growth studies indicate that exposure to power frequency electric and/or magnetic fields, either before or after implantation of a tumor into the animal host, does not affect the development of the tumor (PECO Rebuttal St. 3 at 15).

(PP&L Main Brief at 26)

Finally, PP&L, in its Main Brief at 25, reviews the conclusions of PECO witness Gelmann regarding other cellular research, i.e., (1) research on protein synthesis and RNA transcription (PECO Rebuttal Statement No. 3 [Gelmann] at pp. 15-16); (2) research on slime molds (Id. at pp. 16-17); research on ornithine decarboxylase ("ODC") (Id. at pp. 17-18); research on

calcium efflux in brain tissue slices (Id. at p. 18); research on bone repair (Id. at pp. 18-19); research on melatonin (Id. at p. 19); research on cell proliferation (Id. at pp. 19-20); and research on soft agar clonogenicity (Id. at pp. 20-21). In all of these types of research, PP&L emphasizes that PECO witness Gelmann concluded that the research was either unrelated to the process of carcinogenesis; created no suggestion of an adverse health impact; was inconsistent in its results; or did not provide a pathway by which exposure to EMF could cause cancer in humans (Id. at pp. 15-20).

The Prosecutory Staff (Staff), which also presented no witnesses of its own at the hearing, argues that Dr. Liboff's analysis, when considered in the context of the other record evidence, ". . . is reduced to the following:"

> 1. Transient changes in the circadian rhythm of the level of the hormone melatonin in rats on exposure to pulsed electric fields which causes no ill effects to the rats (OCA Statement No. 1, p. 8; PECO Rebuttal Statement No. 1, pp. 17-18).
>
> 2. Alterations in *in vitro* mitogen-exposed cell proliferation seen upon exposure to EMF, such experiments having not been replicated except where EMF of a decidedly different character is used (OCA Statement No. 1, p. 8; PECO Rebuttal Statement No. 3, pp. 16-18, 20-21; N.T. 790-793).
>
> 3. Calcium efflux experiments in which the release of calcium from dead or dying non-functional chick brain tissue is

altered by exposure to certain specific combination of alternating and static electric and magnetic fields, with there being no consistent replication of experimental results (Protestants' Statement No. 2, p. 6; PECO Rebuttal Statement No. 1, pp. 12-13; PECO Rebuttal Statement No. 3, p. 18; N.T. 764-765, 1002, 1009, 1010).

4. Epidemiological evidence derived from occupational studies which did not control for confounders or hidden variables, and studies on childhood leukemia which reported an association between wire code, a subjective surrogate measure of EMF exposure, and the disease, with that association growing weaker with each successive better-run study (PECO Rebuttal Statement No. 2, pp. 13-17, 24-27, 28; OCA Statement No. 1A, p. 4 (corrected at N.T. 1420); N.T. 1409, 1468-1472).

(Staff Brief at 12)

Staff further asserts (Staff Brief at 13-14) that considering that the role of the hormone melatonin is not known in humans (OCA Statement 1A, p. 2; PECO Rebuttal Statement No. 1, p. 17); that dead tissues do not function as living tissues (N.T. 1002); that people are not normally exposed to mitogens (PECO Rebuttal Statement No. 1, p. 23); and that EMF from transmission lines are not modulated or pulsed, but are sinusoidal in configuration (PECO Rebuttal Statement No. 4, pp. 6-16; N.T. 769-770), Dr. Liboff's analysis is not persuasive, standing alone or synergistically in combination, to establish that EMF causes any adverse effect on human health.

Similarly, argues Staff, Dr. Liboff's Ion Cyclotron Resonance Hypothesis (ICR) offers only a theory for the mechanism by which certain phenomena (calcium efflux) or biological effects reported to be associated with exposure to electric and/or magnetic fields occur (Protestants' Statement No. 2 [Liboff] at 5; PECO Rebuttal Statement No. 4 [Rosenberg] at 19-20; N.T. 783). Staff asserts that ICR, itself, is inconsistent with certain principles of physics,[4] the dynamics of water molecule/ion interactions in the cell[5] and the realities of cellular dimensions[6] (PECO Rebuttal Statement No. 4, pp. 17-19; N.T. 1219-1220, 1222-1223, 1229-1235), which prevents its acceptance by a consensus of the scientific community (N.T. 425-426). Thus,

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4 Staff notes that cyclotron resonance occurs only when ions are traveling in a circular path. Any collision with other particles nullifies the effect. Passing through the cell membrane, a ion, like calcium (Ca++) would collide with other particles at a rate of a trillion per second (PECO Rebuttal Statement No. 6, p. 18-19).

5 Staff notes that at the cellular levels, ions such as calcium are surrounded by a shell of water molecules. The calculations used in the ion cyclotron resonance theory only utilize the mass of the ion itself and not that of the ion/water molecule complex (PECO Rebuttal Statement No. 6, p. 19).

6 Staff notes that the size of the circular path necessary for most ions to undergo the ion cyclotron resonance effect is approximately 10 feet. Channels in the cellular membrane through which ions and other molecules enter and exit the cell are submicroscopic (PECO Rebuttal Statement No. 6, p. 18).

Staff argues that at present, Dr. Liboff's theory remains unproven (OCA Statement No. 1, p. 9; N.T. 426-427).

Therefore, Staff contends that the record as a whole demonstrates that the Protestants have not presented evidence sufficient to show that there will be adverse health effects from electromagnetic fields from PECO's line.

OCA approaches the issue by noting that the record in this case primarily addresses two areas of scientific inquiry, i.e., epidemiological and biological research. Epidemiology, the study of humans in their everyday environment, as a science was explained as follows:

> . . . [T]he major strength of epidemiology is that it pertains directly to human beings. As such, facts established through epidemiologic research have direct implications for public health strategies, unlike most laboratory research. The great limitation of epidemiology is that it is a non-experimental science and, consequently, is highly susceptible to error. Both the strengths and the limitations of epidemiology must be recognized when conducting an evaluation of epidemiologic studies.

(PECO Rebuttal Statement No. 2 [Cole] at 5)

OCA further points out that in connection with the science of epidemiology, the record indicates that since it is a non-experimental and imprecise science, it is highly susceptible to errors, and therefore when suggested risks of low magnitude are involved, epidemiologists draw inferences of cause and effect only when there is a reasonably large number of independent

studies with consistent findings (PECO Rebuttal Statement No. 2 [Cole] at 5). Moreover, OCA also notes that the record further indicates that it is the nature of epidemiologic research to produce both positive and negative results even where there is no cause and effect relationship between disease and an agent. Therefore, asserts OCA, there is a need for consistency in results and study associations when assessing epidemiologic studies of human cancer (Id. at 6-7). OCA also recognizes that the record testimony also indicates that it is difficult to interpret EMF epidemiologic studies because of the rise of surrogate measures of exposure (Id. at 7-9); and that it is often difficult to prove a cause and effect relationship with epidemiologic data (OCA Statement No. 2 [Rosenbaum] at 5).[7]

OCA, in referring to PECO's testimony, points out that generally speaking, the study of EMFs and health effects, if any, is in the early stages of development (OCA Statement No. 2

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7 Some cause and effect relationships have been established by epidemiology. Thus, the relationship between cigarette smoking and lung cancer and between certain types of asbestos and mesothelioma were established with epidemiologic data and eventually confirmed by laboratory evidence (PECO Rebuttal St. 2 at 6). But, it took many decades to convince the medical establishment. Indeed, whether drinking moderate amounts of alcohol is good has changed many times (OCA St. 2 at 5-6).

[Rosenbaum] at 6; see PECO Statement No. 2 [Boeggeman] at 10-11)[8] and that the emphasis on EMFs became more pronounced following the Wertheimer-Leeper study, using wiring codes, conducted in the greater Denver area in the 1970's (PECO Rebuttal Statement No. 2 [Cole] at 12). There, an increased death rate from cancer among those near primary and secondary distribution wires was reported (OCA Statement No. 2 [Rosenbaum] at 3). However, OCA notes, that study has been subject to many criticisms due to problems in its design, conduct and analysis (PECO Rebuttal Statement No. 2 [Cole] at 13).

OCA continues and explains that following the Wertheimer-Leeper study, there have been numerous epidemiological studies utilizing various research designs, resulting in various results (PECO Rebuttal No. 2 at 10-11; OCA Main Brief at 27). Thus, OCA states, in 1988, Myers published a study using distance from power lines as a surrogate for magnetic field exposure (PECO Rebuttal No. 2 at 14; OCA Main Brief at 27), and reported a slight <u>increase</u> in cancer risk for those living near a power line, but an <u>inverse</u> association between estimated magnetic field strength and cancer risk (OCA Statement No. 2 [Rosenbaum] at 5; PECO Rebuttal Statement No. 2 [Cole] at 14). OCA then quotes the

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[8] PECO witness Cole reviews approximately 50 epidemiologic studies involving EMFs and cancer and the secondary literature in the area (PECO Rebuttal St. 2 at 10-11).

PECO witness who testified in connection with the Myers study that

> In other words, residences close to a power line were associated with a slightly smaller risk of cancer than those further away from a power line (PECO Rebuttal No. 2 at 14). The study has been criticized due to limitations in it and as PECO witness Cole noted, the Myers study does not provide persuasive refutation of the hypothesis that magnetic fields are related to childhood cancer (OCA Main Brief at 28; PECO Rebuttal No. 2 at 14).

OCA, in referring to another study conducted by Tomenius in Sweden, which utilized the case-control method using both distance from power lines and measured fields rather than the Wertheimer-Leeper classification (OCA Statement No. 2 [Rosenbaum] at 3-4), only three-tenths of the expected number of cases of leukemia in those more highly exposed to magnetic fields, were observed (OCA Statement No. 2 [Rosenbaum] at 4); and an inverse relationship between cancer risk and measured magnetic fields was found (PECO Rebuttal at 15). Thus, OCA argues, that while PECO asserts that this study provides no support for the hypothesis that EMFs are related to an increased risk of childhood cancer (PECO Rebuttal 2 at 15), the OCA witness cautions, that an increase in the incidence of brain tumors and benign childhood tumors among those with higher field readings and nearer power lines were noted (OCA Statement No. 2 [Rosenbaum] at 4).

OCA next points out that the Savitz study (conducted in Denver) used wiring codes (as in the Wertheimer and Leeper study), and in addition, data was collected on measured magnetic fields as well as other data such as parental smoking (PECO Rebuttal No. 2 at 15; OCA Main Brief at 29). Only modest effects as a function of measured magnetic field strengths in homes were reported (OCA Statement No. 2 [Rosenbaum] at 4), but positive associations between wiring code and childhood cancer were reported (PECO Rebuttal Statement No. 2 [Cole] at 17; OCA Statement No. 2 [Rosenbaum] at 4).

OCA then discusses the Peters study, a residential case-control study of childhood cancer conducted in California, which found no association between spot measurements of magnetic fields or 24-hour measurements of magnetic fields and childhood cancer (PECO Rebuttal No. 2 at 17-18), but there was an association found between wiring code and childhood leukemia (N.T. 1129).

Based upon all of the foregoing studies, the OCA witness concluded:

> The present epidemiological evidence is suggestive, but far from conclusive. Several studies by well qualified epidemiologists have reported associations between what may be surrogates for long-term average field strength and various types of cancer. Sometimes there is no apparent correlation when actual measured (short-term) field strength is used instead of the surrogate. Other studies have reported either no

> significant correlation or no relationship between fields or field surrogates and cancer. Authors of one study have observed negative correlations between exposure to high magnetic fields and cancer. Another study reports increased cancer, but lower total death rates (due to less cardiovascular disease for those exposed to high fields). One study reports high cancer incidence for people farther from a power line than for people closer to a power line. Excesses of different cancer show up in different studies.

(OCA Statement No. 2 [Rosenbaum] at 3 [references omitted])

In addition to epidemiological studies, OCA notes that there has also been biological research. In this regard, OCA points out that it is important to understand the term "biological plausibility." OCA quotes PECO witness Cole's definition, as follows:

> Biological plausibility refers to the question of whether there is a credible biological mechanism that supports the hypothesis that exposure to the agent causes cancer. Biological plausibility can be established either through mechanistic research, or through animal research that shows that exposure to the agent causes cancer in experimental animals.

(PECO Rebuttal No. 2 at 19)

In this regard, OCA explains, biological research has investigated a wide variety of biological effects in humans, animals and cellular systems with both positive and negative results reported (OCA Statement No. 1 [Janes] at 6). OCA argues that the record suggests that growth and development, morbidity,

blood cell populations, serum chemistry and cardiovascular function appear to be unaffected by exposure to weak electric and magnetic fields (OCA Statement No. 1 [Janes] at 6); although perception may be affected by weak electric fields but not magnetic fields (OCA Statement No. 1 [Janes] at 8) and animal studies have observed effects on certain circadian rhythms from exposure to weak electric and magnetic fields (OCA Statement No. 1 [Janes] at 8). OCA states that the record further indicates that weak fields affect the concentration of melatonin[9] levels; and that in some laboratory studies, nighttime concentrations of melatonin in rat pineal glands were suppressed by exposure to 60 hertz electric fields (OCA Statement No. 1 [Janes] at 8). OCA further comments that another study by Kavaliers observed the effect of a short period of exposure (N.T. 992-993) to a static magnetic field on the nocturnal response of mice to morphine which is consistent with the reduction of nocturnal pineal gland activity and levels of melatonin. However, OCA points out, the effect was reversed when the mice were removed from exposure to the magnetic fields (OCA Statement No. 1 [Janes] at 8). Thus, OCA contends that the rat melatonin study cannot provide a basis for concluding that power frequency electric or magnetic fields

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9 Melatonin is a hormone that is produced by the pineal gland (PECO Rebuttal No. 1 at 17) and, among other things, regulates sexual function and development (OCA St. 1 at 17).

leads to adverse effects on human biologic rhythms (PECO Rebuttal No. 1 at 18; OCA Main Brief at 37).

OCA further notes than in the study by Tamarkin published in 1981, melatonin appears to affect the incidence of chemically induced mammary tumors in rats (OCA Statement No. 1A [Janes] at 2). Thus, the OCA witness testified that Tamarkin's study showed that

> . . . melatonin significantly reduced the incidence of mammary tumors in rats treated with the tumor promoter DMBA and partially reversed the increased incidence of tumors in rats whose pineal glands had been removed (OCA St. 1A at 2).

But, asserts OCA, the record testimony also indicates that these studies cannot be extrapolated to humans (N.T. 994-995). The OCA is careful to add (OCA Main Brief at 38) that Tamarkin's study, in addition to other studies that report a suppression of melatonin levels, raises obvious scientific questions that have not been resolved.

OCA also discusses a published study by Demers et al, indicating an association between occupational exposure to electromagnetic fields and breast cancer in men and the suggestion from Wilson's work that low frequency electromagnetic fields may affect melatonin levels in some humans (OCA Statement No. 1A [Janes] at 2; N.T. 1464). But, again OCA cautions, important questions remain unanswered (OCA Main Brief at 39).

OCA also points out that other studies of cellular systems have observed effects from exposure to weak fields. The primary study into the effects of magnetic fields on the transcription of ribonucleic acid (RNA)[10] and protein synthesis was conducted by Goodman (OCA Statement No. 1 [Janes] at 8). In that study, various types of cells, including cells from insect salivary glands, were exposed to pulsed fields, modulated fields and power frequency fields, and certain cellular processes in those cells were examined following exposure (PECO Rebuttal No. 3 at 16). Goodman has also investigated the effects of magnetic fields on protein synthesis in tissue culture preparations of human cells (OCA Statement No. 1 [Janes] at 9), and found alterations in the synthesis of both RNA and protein (OCA Statement No. 1 [Janes] at 10).

OCA also comments that other research on cellular systems is being conducted in the area of cell proliferation. Thus, in a study by Byus and co-workers, alterations in the

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10 The record testimony was that RNA is important because it copies information from DNA so that proteins can be produced (OCA St. 1 at 8). Changes in DNA are necessary to the causation of cancer. Once the DNA has changed, the cell has the capacity to repair the DNA. If the DNA is not repaired, there is a mutation, which, depending on the mutation, is important in the causation of cancer (N.T. 1153-54). Cancer promotion, however, is usually caused by an agent which facilitates cell proliferation, while the progression of cancer is something which can happen all by itself (N.T. 1153).

activity of ornithine decarboxylase (ODC) levels were reported after exposure to 60 hertz electric fields. ODC levels increase in growing and replicating cells (OCA Statement No. 1 [Janes] at 9). OCA further notes that in a study by Ross, combining extremely low frequency magnetic fields with static magnetic fields, small decreases in the proliferation of cells were reported (OCA Statement No. 1 [Janes] at 9); and in an experiment where the frequency of the magnetic field was held constant at 100 hertz and its amplitude varied, cell proliferation first decreased and then increased as the amplitude of the magnetic field was increased (OCA Statement No. 1 [Janes] at 9). OCA concludes, inter alia, that the record evidence, as to the studies, indicates diverse results. Thus, OCA maintains that it is not possible at this time to draw conclusions as to human health from the animal and cellular systems research (OCA Statement No. 1A at 2; N.T. 994-95).

The Administrative Law Judge has carefully considered the record evidence in this proceeding and notes the conflicting conclusions reached by the experts representing the various parties in this controversy.

On the one hand, Protestants' expert (Dr. Liboff) testified, inter alia, that:

> 1. Human cells exposed to very weak ELF magnetic fields change in a definite way, i.e., they consistently exhibit an increase in DNA

synthesis over cells not exposed, but this is difficult to model (Protestants' St. 2 at 2);

2. Other studies have shown such effects, i.e., Marron et al showed that such fields can affect cell cycle; Goodman et al showed that protein synthesis is affected; Bawin et al found that calcium efflux from brain tissue is enhanced (Protestants' St. 2 at 2);

3. Epidemiological work by Wertheimer suggests a connection between leukemia deaths and power line fields; and the Savitz study in essence verified the Wertheimer work (Protestants' St. 2 at 3);

4. Independent evidence relating to bone repair studies, altered cell responses and epidemiological cancer studies must be regarded as connected in that they share the common characteristics of ELF-induced biologic change (Protestants' St. 2 at 3);

5. The research in these areas indicates that a variety of physiological processes are exquisitely sensitive to weak ELF magnetic fields, and one of these pathways apparently leads to cancer in humans (Protestants' St. 2 at 4);

6. Research on the use of electric blankets during pregnancy in the first trimester can lead to problems; and there is parallel evidence indicating that embryological changes occur in both chick eggs and in fish eggs following exposure to weak ELF magnetic fields (Protestants' St. 2 at 4);

7. Research by Dr. Bary Wilson indicated endocrine changes connected to the pineal glands in animals and humans following electromagnetic exposure (Protestants St. 2 at 4);

8. Graham and Cohen have reported evidence of changes in human heartbeat in a group of men exposed to 60 Hz magnetic fields for short periods of time (Protestants' St. 2 at 5);

9. Dr. Russell Reiter has asserted that magnetically-induced changes in melatonin output by the pineal gland has caused some sleep disorders (Protestants' St. 2 at 5);

10. There is a hazard to humans from exposure to weak, extremely low-frequency magnetic fields (Protestants' St. 2 at 5);

11. The Ion Cyclotron Resonance (ICR) hypothesis demonstrates that specific combinations of ac and dc magnetic fields can act to put different biological ions such as calcium, potassium and magnesium into resonant states and thereby influence their transport into and out of the cell; and that although most of the experiments (in diatoms, in human lymphocytes, in embryonic chicks, in rabbits, in yeast and in bacteria) have been successful, there have been a few negative results (Protestants' St. 2 at 5);

12. In exposing human lymphocytes to calcium-tuned magnetic fields, changes in calcium uptake were observed (Protestants' St. 2 at 6);

13. Mouse myeloma and lymphoma cells indicated extraordinarily high rates of proliferation in ELF magnetic fields; although the study was never published because of the uncertainty of the strengths of the response (Protestants' St. 2 at 6);

14. Human cancer cells, at least in vitro, can show significant progression following exposure to weak 60 Hz magnetic fields at specific geomagnetic resonance values (Protestants' St. 2 at 6).

On the other hand, PECO's expert witnesses concluded, inter alia, that:

1. Electric fields experienced directly under AC power transmission lines are below or just at the threshold of perception for most animals

and man. There is no evidence that humans can perceive 60 Hertz magnetic fields at levels that far exceed the levels associated with transmission line absent external cues.

2. Electric field strengths several times greater than the threshold for perception may cause an initial arousal response. However, this response fades rapidly and the animals habituate to such fields. Chronic exposure to such fields caused no obvious abnormality in neurologic function or behavior. There is no evidence that such fields elicit a stress response.

3. There is no evidence that power frequency electric or magnetic fields alter intracellular calcium levels or that calcium acts as a transducer of EMF effects on nerve, endocrine or immune cells.

4. There is no scientific basis to conclude that power frequency electric or magnetic fields have any significant effects on circadian rhythms involving body functions or critical pituitary hormones.

5. There is adequate experimental data to show that EMF do not adversely affect complex endocrine system function needed for successful reproduction, growth or development.

6. Immune cell viability and function is not significantly affected by exposure to EMF and no adverse effects have consistently been demonstrated in intact animals.

7. There is no basis to conclude that power frequency electric and/or magnetic fields have adverse effects on the health and function of the endocrine or immune systems.

(PECO Rebuttal Statement No. 1 [Bockman] at 26-27)

and

8. Epidemiologic reports fail to demonstrate any strong or consistent pattern of association between EMF and cancer among human beings. Even among the positive studies, findings are not supported by the internal characteristics of the data. Thus, to date, there is no demonstrative relationship between EMF and cancer in human beings.

9. Since EMFs have not been demonstrated to be carcinogenic, the 230 kV transmission line poses no threat of cancer to persons in its vicinity.

(PECO Rebuttal Statement No. 2 [Cole] at 28)

and

10. The body of well-done research examining known processes and endpoints related to carcinogenesis, excluding mutations, chromosomal change, whole animal tumor formation and tumor growth in intact animals, has consistently shown that exposure to power frequency fields does not affect the process of carcinogenesis. In addition, there is a body of research that examines processes and endpoints unrelated to carcinogenesis. Some of the research has reported that exposure to power frequency fields can cause measurable change in the endpoint studied. Many of these studies are subject to individual criticism based on the design or conduct of the study, and even if the reported results of these studies are valid, they do not indicate that exposure to power frequency fields affects carcinogenesis. The endpoints studies are simply not related to that process.

11. The number of biological endpoints is not the relevant issue, but whether the processes involved are related to an adverse health outcome is. The argument that biological effects must lead to adverse health is contrary to basic biological and medical facts.

12. The extensive research on molecular and cellular biology and cancer provides no scientific basis to conclude that power frequency electric and/or magnetic fields cause, promote, or contribute to the development of cancer or other adverse health effects. This is consistent with the conclusions reached by independent scientific commissions and agencies that have reviewed this research, such as the American Institute of Biological Sciences, the Virginia Department of Health, the Maryland Department of Natural Resources, and the California Department of Public Health.

13. There is no scientific basis to conclude that the power frequency fields associated with the Woodbourne-Heaton 230 kV transmission line would cause adverse health effects, including cancer.

(PECO Rebuttal Statement No. 3 [Gelmann] at 22-23)

and

14. Power frequency fields, such as those that will be associated with the Woodbourne-Heaton line, exist along a range of energy frequencies known as the electromagnetic spectrum. These power frequency fields are very different from other types of fields, such as ionizing radiation, microwaves, and radio frequency waves. In addition, the specific waveform or shape of the sinusoidal power frequency fields makes them very different from pulsed fields or modulated fields. With regard to the ion cyclotron resonance hypothesis, that theory is inconsistent with the way ions actually act in the human body, and there are numerous theoretical and practical objections to the theory from a physics point-of-view.

15. There is no persuasive evidence that exposure to 60 Hz fields from the Woodbourne-Heaton line would result in an ion cyclotron resonance effect in the human body.

16. At the molecular level, the theories such as ion cyclotron resonance that attempt to explain a mechanism for such an interaction are highly speculative at best. Based on the witness' knowledge and understanding of biophysics, medicine, and the research publications on power frequency fields, there are very good reasons to believe that exposure to power frequency fields does not cause any significant biological effects, and it is his opinion that exposure to electric and/or magnetic fields from the Woodbourne-Heaton 230 kV line will not result in adverse health effects in humans.

(PECO Rebuttal Statement No. 4 [Rosenberg] at 20-21)

The OCA's experts concluded, inter alia, that:

1. Weak electric and magnetic fields affect biological systems.

2. The biophysical and biological mechanisms that give rise to the observed effects of exposure to weak electric and magnetic fields are either not known or poorly understood at this time.

3. The effects seen in cellular systems are useful for investigating mechanisms and generating hypotheses to test in animal studies. Because isolated cells or cell preparations may function and react differently than the same cells in a live animal the results of these studies cannot be directly extrapolated to animals.

4. The weak field effects observed in animals are subtle and often transient or reversible; therefore, the connection between these effects and any harm to human health is unclear.

5. Since weak electric and magnetic field effects occur, the possibility of harmful effects cannot be summarily or categorically rejected, and concerns about harmful effects are legitimate.

(OCA Statement No. 1 [Janes] at 10)

6. With respect to the implications of the epidemiological literature, the picture is very confused. It is not even clear that even if exposure to power lines does increase the risk of cancer, that it is the average magnetic field that is the cause.

7. Ionization can have disastrous consequences for cells, including death, mutation and initiation of cancer. However, power transmission and distribution fields are nonionizing because they have energies that are too small to produce ionization; therefore, the mechanisms by which ionizing radiation produces damage in living cells do not apply to power frequency electric and magnetic fields.

(OCA Statement No. 2 [Rosenbaum] at 1, 5, 6)

In view of all of the foregoing conflicting expert scientific studies, testimony and conclusions on the issue presented, i.e., whether exposure to EMFs causes adverse human health effects, the evidence of record in this proceeding, taken as a whole, leads to the ultimate finding and conclusion that the scientific studies at present are inconclusive; and therefore, the record evidence does not support a finding and/or conclusion that such exposure is harmful to human health. That is to say, that there has been no clear and convincing demonstration of such causality, nor is the preponderance of the evidence sufficient to support such a finding and/or conclusion. Thus, within the framework of the issue framed by the Commonwealth Court and the Commission in this case, it cannot be said that the record evidence supports a finding and/or conclusion that exposure to

EMFs causes adverse human health effects. The scientific evidence of record is inconclusive at this point in time.

While the foregoing may be dispositive of the health issue remanded to the Commission by the Commonwealth Court, it does not resolve all of the concerns of those persons living near the transmission line.

Protestants have also asserted that energizing the Woodbourne-Heaton Line will result in adverse land use impacts and maintain that the Commission must consider the effects of the Woodbourne-Heaton line on land use in the areas adjacent to and in close proximity to the line. Protestants, however, do not contend that the Commission has the authority to determine eminent domain damages. Protestants cite 52 Pa. Code §57.75(e)(3)(i), which provides, inter alia, that

> (e) At hearings held under this section, the Commission will accept evidence upon, and on its determination of the application it will consider, inter alia, the following matters:
>
> . . .
>
> (3) the impact and the efforts which have been and will be made to minimize the impact, if any, of the proposed HV line upon the following:
>
> (i) Land use.

While the foregoing provision is stated to be applicable in matters where a siting application has been filed, it appears equally applicable in the instant matter in light of

the fact that both the Court and the Commission in their respective Orders set forth the issue to be whether Petitioners (Protestants) will be adversely affected by the reconductoring of the high tension line. An adverse land-use effect, if supported by convincing record evidence, would be an adverse effect upon Protestants.

In this regard, Protestants' witness Turner testified as to changes in land use patterns by reason of the cumulative effect of land use decisions by individual property owners due to the fear and alarm concerning EMFs. He testified that continued urbanization of the large townships crossed by the line is a significant factor in deciding whether it should be energized (Protestants' Statement No. 1 [Turner] at 1); that standards exist for the strength of EMFs in New York, Florida, Britain, Japan, Poland and the former Soviet Union (Id. at 2-3); that uncertainty and fear constitute a variable in the planning of utility facilities (Id. at 3-5); that fear of EMFs provides motivation for families to leave their homes (Id. at 5-6); that prudent avoidance may not justify costly and major rerouting of extant facilities, but may justify the modest cost of regulating proposed facilities so as to avoid potentially greater costs down the road (Id. at 7). The witness emphasized the prudent avoidance approach (Id. at 7-8) and stated that energization will have an effect on property values and cause disinvestment (people

leaving their homes under financial duress) (N.T. 556-561); that the building and energizing of the line is something that persons living adjacent to it consider as an onerous land use and a nuisance (N.T. 683). In this regard, Protestants' witnesses testified, inter alia, that their use and employment of their property will be significantly changed due to the presence of the transmission line. Some of the Protestants will restrict their children's play in their backyards in order to limit EMF exposure (N.T. 144-145, 162-163, 203). Others will no longer use the park area in the development (N.T. 188-189, 195). These self-imposed restrictions and limitations are an attempt to prudently avoid perceived potential adverse health effects, and thus their testimony indicates that they will alter their use of their property (N.T. 166, 203-204, 216, 223). Additionally, a number of Protestants testified that they are attempting to sell their properties due to their perceived fear of potential health effects from exposure to EMFs (N.T. 204-206, 234, 244).

PECO contends that Protestants did not meet their burden of proving that the line would cause adverse land use impacts sufficient to warrant disapproval of the line. PECO argues that Protestants' witness Turner's testimony that continued urbanization was an essential basis for his adverse land use impact conclusion is flawed because he did not even analyze the area immediately adjacent to the line to determine

whether it is urbanized (N.T. 547, 552, 554-55), but instead analyzed urbanization problems solely for entire townships adjacent to the line and thus his recommendations are based on data for geographic areas as far distant from the line as 4.5 miles away (N.T. 546). Moreover, argues PECO, witness Turner's analysis dealt only with land use implications of EMFs (Protestants' Statement No. 1 [Turner] at 5), did not know what the field levels would be (N.T. 548). Further, PECO points out that witness Turner did not review the land uses for the full length of the line, but only a portion along the center of the right of way covered by four Delaware Valley Regional Planning Commission aerial photographs (N.T. 1252). In addition, PECO notes that witness Turner admitted that he was not aware of any existing conflicts with local zoning ordinances (N.T. 613); did not conduct any appraisals (indeed, he is not an appraiser, real estate agent or broker), and had no market data (N.T. 560). His opinion was based upon interviews with the Protestants (N.T. 567) and some local real estate agents (N.T. 568), and on some articles he had read (N.T. 571-79); but the items relied upon by witness Turner actually concluded that transmission line construction does not affect property values (N.T. 571, 574, 576, 577, 579).

On the other hand, PECO emphasized the testimony of its witness Van Dyke who analyzed urbanization problems in the

regional area (PECO Rebuttal Statement No. 5 [Van Dyke] at 4; Exh. CVD-2) and immediately adjacent to the line (Id. at 9-10; Exh. CVD-8) concluding that the area near the line is not generally categorized as a high density urban area, nor is it expected to reach that categorization even if the Corridor Area Study (CAS) becomes fully developed (Id. at 11), and that the line does not conflict with the zoning adjacent to it (Id. at 12). Moreover, argues PECO, the fact that some people are concerned about property values does not establish that such values will decrease and PECO's witness concluded that his analysis did not reveal that consideration of the EMF issue impacted on land use, zoning or property values (Id. at 15). Additionally, PECO contends that past and current market valuations already include market effects for proximity to a utility corridor, which until 1986 included an active transmission facility (Id. at 13-14). PECO further asserts that witness Turner had no market data to support his opinion that property values will decline (N.T. 560), or that disinvestment[11] will occur near the line, or that disinvestment would cause changes in local land use patterns. Finally, PECO argues that there is no basis to support witness Turner's claim that the line is a "nuisance."

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11 Disinvestment refers to a situation in which one feels compelled by circumstance to sell property at a loss (N.T. 561).

The Prosecutory Staff points out that the Commission's March 8, 1991 remand Order noted that the consideration of alleged decreases in property value is outside its jurisdiction. Indeed, Staff presents a scholarly review (Staff Main Brief, pp. 17-34) of the applicable law leading to its ultimate conclusion that (Staff Main Brief, pp. 33-34):

> Considering that the original purpose of Sections 57.72(c)(7) and 57.75(e)(3) was to assure that the Commission be provided with information which would allow it to carry out its constitutional obligation to protect the natural resources of Pennsylvania, a public interest issue, it stretches credibility to contend that the inclusion of the terms "land use" and "landscape" in the siting regulations allows the Commission to consider a purely private financial concerns like the market value of an individual property. While the Commission may examine the environmental impact of the proposed line on an individual property which will be physically burdened with the line's presence, and on adjacent properties as to aesthetics and safety,12/ Prosecutory Staff does not believe that the intent behind the above-cited regulations permits the Commission to assess damages (decrease in market value) as a result of that environmental impact on property which will be physically burdened with the line or a fortiori, on property adjacent to the line.

12/ See, Pennsylvania Environmental Services, inc. v. Pa. Department of Environmental Resources, 94 Pa. Commonwealth Ct. 182, 189, note 9, 503 A.2d 477, 480, note 9 (1986).

Staff further argues, assuming arguendo that the Commission has authority to consider market values, that the

record evidence establishes that the line will have minimal, if any, impact on property values adjacent to the line. Staff bases this argument on Protestants' witness Turner's admission that his testimony that property values could be expected to decrease by up to 25% after energization, was based on general articles which he did not fully read (N.T. 569-570); and upon articles which contradicted his position (N.T. 572-573, 575-582); and upon the testimony and interviews of PAUSE members, which, Staff asserts, is highly biased. Staff also points to the fact that the towers, which witness Turner described as a threatening element in transmission lines (Protestants' Statement No. 1 [Turner] at 5), have been on the corridor since 1938 which is well before Protestants purchased their homes. Thus, Staff argues that the original purchase price of Protestants' properties reflected the presence of the towers, the railroad and energization of the line; citing PECO Rebuttal Statement 5 at 13-14.

OCA submits that a utility's power to locate facilities and its power of eminent domain must always be tempered by individual property rights. OCA argues that it was the Commission's intent to consider all impacts prior to construction of a transmission line, citing Re: Proposed Electric Regulation, 49 Pa. PUC 706, 710; and that this intent was thwarted in this proceeding by PECO's use of the Letter of Notification procedure. The OCA further submits that the evidence in this proceeding

supports that the right-of-way has been substantially altered by PECO's construction of a 230 kV transmission line when no electric line had been energized on the right of way since at least 1986 (N.T. 10). Therefore, OCA submits that the Letter of Notification procedure should not have been utilized, and that Protestants are entitled to a hearing on all issues, including those of the need for the line and alternative routes.

The Administrative Law Judge has carefully considered the record evidence and the arguments of the parties on land-use effects. First, the Letter of Notification argument advanced by the OCA, while addressed to the Administrative Law Judge, essentially appears to be a reargument to the Commission on an issue already decided by the Commission, and which the Administrative Law Judge has no power to disturb and which the OCA itself has recognized as hereinabove set forth, i.e.,

> The OCA recognizes that the Administrative Law Judge, as the Presiding Officer in this case, must work within the Orders issued in this proceeding, and that it is not within the power of the ALJ to reconsider prior orders of the Commission.

Thus, on the issue of the Letter of Notification procedure utilized by PECO, the Commission, in its Order adopted March 6, 1991, entered March 8, 1991, at 8-11, in this proceeding, has already stated:

> Also in support of their request to reopen the instant proceeding, the Petitioners allege that they would prove that

PECO had erroneously used the letter of notification procedure in this case because of PECO's misstatement of critical facts. The Petitioners argue that PECO was not reconstructing this line because it had never constructed a line on this property before. In its letter supplementing its petition, the Petitioners also allege that PECO was not accurate in its representation regarding the extent of the new right-of-way it had to acquire for the line.

The Commission, however, was fully apprised of the circumstances surrounding PECO's reconstruction of this line. PECO stated in its Letter of Notification that it proposed to rebuild and reconductor an abandoned railroad 138 kV transmission line. It stated that it purchased the Conrail right-of-way and the existing structures which had supported the line and would use 176 of the 236 existing structures in the rebuilt line.

In its Letter of Notification, PECO also stated that:

> Woodbourne Substation property abuts the north property line of Conrail's Trenton Cut-Off Branch. Just west of the substation and abutting the railroad property on the south side is Buehl Field Airport. Existing railroad structures cannot be used in this area due to the required height limitations near the airport runway.
>
> PECO has purchased a two (2) acre vacant, irregular shaped property which separates the substation property from the railroad. This property will be used to divert the line from the railroad into the substation prior to reaching the approach to runway 24 at Buehl Field. This will

> greatly reduce or eliminate conflict with the runway.

In its Letter of Notification, PECO also discloses that the two acre parcel of land will contain a 0.06 mile section of the line (PECO's Letter of Notification, p. 3). Under the circumstances, PECO did not misrepresent the route of the right-of-way for its proposed line.

Furthermore, in its letter of notification, PECO stated that it was proceeding pursuant to Sections 57.72(d)(1)(iv) and 57.72(d)(1)(v) of the Commission's regulations. Section 57.72(d)(1)(iv) provides that the letter of notification procedure may be used where

> [a] line for which the voltage is proposed to be increased above its present levels, so long as the size, character, design or configuration of the proposed line does not substantially alter the right of way

52 Pa. Code §57.72(d)(1)(iv) (emphasis added).

Section 57.72(d)(1)(v) provides that the letter of notification procedure may also be used where

> an HV line which is to be reconductored or reconstructed so long as the size, character, design or configuration of the proposed HV line does not substantially alter the right of way.

52 Pa. Code §57.72(d)(1)(v). (emphasis added).

Because PECO intended to reconductor or rebuild an existing high voltage transmission line, PECO's use of the letter of notification procedure was not erroneous.

That the line must travel along 0.06 mile section of new right-of-way (which was not part of the original Conrail line) to avoid conflicts with the use of an airport runway does not substantially alter the right-of-way of the original line so as to preclude PECO's use of a letter of notification in this proceeding.

However, in its statement, the OCA argues that the difference between the proposed 230 kV line and zero voltage, currently the voltage of the abandoned Conrail line, represents a substantial change in the right-of-way which should have warranted PECO filing an application for this line. We disagree. Although the Conrail transmission line has not been recently in use and has been at zero voltage for this period of time, it originally operated at 138 kV. Thus, the Petitioners cannot rely on the expectation or the presumption that the voltage on this transmission line would remain at zero indefinitely. As reflected in the Commission's prior order approving PECO's Letter of Notification, the increase from 138 kV, the original operating voltage of the Conrail line to 230 kV, the voltage for the proposed PECO line, was deemed not to have significantly altered the original Conrail right-of-way (Order entered February 9, 1990 at A-110550, F.055, p. 3). Under the circumstances, both PECO's use of the letter of notification and the Commission's approval thereof are factually supportable.

Finally, it is important to note that Commission regulations do not require that the high voltage transmission line be one that was owned or used by the electric utility which is proposing the reconstruction.[7] Therefore, PECO's not previously owning the Conrail transmission line it now proposed to rebuild has no effect on PECO's ability to proceed under the Commission regulations governing letters of notification.

7/ For that matter, Commission regulations do not require that the line to be reconstructed be used for the purpose of providing utility service to the public. In this case, however, this line was previously owned and operated by Conrail and for many purposes, railroads, including Conrail, are classified as public utilities under 66 Pa. C.S. §102.

. . .

The Commission continued,

> In considering the approval of siting applications or letters of notification, Commission regulations at 52 Pa. Code §§72.1, et seq., require the Commission to consider the issues raised by the Petitioners as well as other environmental factors. In its order on PECO's Letter of Notification, the Commission considered public need for the proposed line, and we stated that the proposed line would "provide a second source of 230 kV supply for both the Woodbourne and Linton substations, thus preventing line overloads and low voltage conditions in the event of an outage of the Buckingham-Linton 230 kV line segment." Order entered February 9, 1990 at A-110550, F.55, p. 2. The Commission's order also stated that the need for this back-up line was precipitated by the area's high load growth which also required the expansion of distribution facilities. Id. at pp. 2-3. As to safety of the line, the Commission noted that the line would be designed, constructed and maintained in accordance with the National Electric Safety Code and that minimum standards would be met or exceeded. Id., p. 3.

Moreover, as to whether the use of the abandoned Conrail line constituted a substantial change in the right-of-

way, the Commission has already passed upon this question, stating,

> Aesthetics and environmental impact of the proposed 230 kV were also considered by the Commission in finding that the existing utility right-of-way was not significantly altered by PECO's reconstruction of Conrail's 138 kV line.
>
> > Analysis of the foregoing detail reveals that in this case, PECO proposes to utilize an existing utility corridor on which there is erected an existing (but now abandoned) 138 kV transmission line as a common corridor for the proposed 230 kV transmission line. Consequently, the rebuilding and reconductoring of the existing 138 kV transmission line into a single circuit 230 kV transmission line utilizing most of the existing support structures will not alter the existing right-of-way. Moreover, the now-abandoned railroad electrification is more than 50 years old, and most of the industrial and residential properties adjacent to the railroad right-of-way were constructed with the railroad transmission line and catenary system already in place, implying at least some acceptance thereof.
>
> Id., p. 3.

The issues which the Petitioners would allegedly have raised if they had been given the opportunity have already been considered by the Commission in approving PECO's Letter of Notification on the Woodbourne-Heaton 230 kV line. Therefore, Petitioners have not raised any new or novel arguments which have not been considered by this Commission in this proceeding or any other proceeding on

> electric transmission lines. Although the Petitioners also allege a need to address EMF issues not heretofore expressly considered by the Commission in approving the PECO Letter of Notification, as well discuss below, this issue is inappropriate and does not present significant basis upon which to reopen the siting proceeding.

Thus, OCA's argument that the Letter of Notification procedure should not have been used has already been ruled upon by the Commission and the Administrative Law Judge is powerless to overturn the lawful Order of the Commission or the Commission's Regulations authorizing use of the Letter of Notification procedure. Thus, 66 Pa. C.S. §316 provides, inter alia,

> Whenever the Commission shall make any rule, regulation, finding, determination or order, the same shall be prima facie evidence of the facts found and shall remain conclusive upon all parties affected thereby, unless set aside, annulled or modified on judicial review . . . .

The instant matter will afford the Commission the opportunity to consider the additional EMF issue, and it is toward that end that the hearings in this proceeding were held.

Likewise, OCA's recommendation concerning Commission consideration of amending its Regulations regarding siting applications, while addressed within the context of this case, is essentially not a matter for the Administrative Law Judge to determine since it is not within the authority of the Administrative Law Judge to order changes in Regulations.

Instead, OCA's contentions are addressed to action within the sole province of the Commission to take. Thus, OCA submits

> . . . that the Commission's regulations at 52 Pa. Code §57.72(d) are not adequate to address the emerging concerns regarding EMFs and the effect that such concerns have on landowners adjacent to or near transmission line rights-of-way.
>
> Moreover, the Commission's regulations that allow for the use of the Letter of Notification procedure are flawed in that the regulations require a finding of fact by the Commission that the use of the right-of-way will not be "substantially altered" without the receipt of evidence on that fact. The OCA submits that this case has highlighted the point that the factual determination as to what constitutes a substantial alteration of the right-of-way is one that requires either evidence or specific guidelines from the Commission. This is even more important given the uncertain risk of potential health effects faced by those living near transmission lines.
>
> As such, the OCA submits that the Commission should consider amending its regulations to provide adequate notice to all neighboring landowners in transmission line siting proceedings. The OCA urges the Commission to propose amendments to the regulations, publish them in the Pennsylvania Bulletin and receive public comment on these regulations. It is only in this way that those affected by the construction, reconstruction, or reconductoring of transmission lines can be assured of adequate notice and an opportunity to be heard.

(OCA Main Brief, pp. 56-57)

Again, the foregoing OCA recommendation, while not within the scope of the specific issue before the Administrative

Law Judge, is presented in extenso for the Commission's consideration for such action as the Commission in its discretion deems appropriate and just. Moreover, the Administrative Law Judge recommends that the Commission consider modification of its regulations along the lines suggested by the OCA.

As to the contention that the presence and energization of the line will cause a decrease in property values and/or disinvestment, the Commission has already spoken as to its authority. Thus, in the March 8, 1991 remand Order, the Commission stated at page 10, footnote 9,

> 9/ The Petitioners contend that they would have also raised the issue of depreciation of their property values caused by the electric transmission line, and that in fact their properties were taken by "inverse condemnation." However, these issues are outside the Commission's jurisdiction. Thus, the desire of the Petitioners to raise this issue at a hearing is irrelevant and does not support their request to reopen the record.

Moreover, the authority of the Commission to consider "land use" and "landscape" impacts, under 52 Pa. Code §§57.72(c)(7), 57.75(e)(3)(i) and (e)(3)(vi), cannot and does not operate to expand the Commission's jurisdictional authority so as to permit it to consider alleged damages to private property. Additionally, as Staff argues, the Commission has not been given authority under any other statute to assess damage to private property value caused by the activities of a public utility.

Thus, in eminent domain proceedings, assessment of damages caused by the taking is to be made by the Court of Common Pleas and not the Public Utility Commission under the Eminent Domain Code, see 15 Pa. C.S. §1511(g); and 26 P.S. §§1-101, et seq. The foregoing is also consistent with applicable case law where claimants against public utilities have sought an award of damages for alleged notations of 66 Pa. C.S. §1501. Thus, the Courts have determined that the Commission has no authority to award damages. Feingold v. Bell Tel. Co. of Pa., 477 Pa. 1, 383 A.2d 791 (1977); Elkin v. Bell Tel. Co. of Pa., 49 Pa. 123, 420 A.2d 371 (1980). Moreover, the Commission has recognized that the assessment of damages resulting from a line's impact or individual land use was properly adjudicable in another forum. Re Philadelphia Electric Company, 52 Pa. P.U.C. 198, 203, 206, 207 and 209 (1978). See also, Re West Penn Power Company, 68 Pa. P.U.C. 262, 268 (1988) and Re Pennsylvania Power & Light Company, 70 Pa. P.U.C. 164, 181 (1989). Accordingly, for all of the foregoing reasons, determination of damages due to alleged decreases in market value is not within the Commission's jurisdiction to hear and determine.

This, however, does not dispose of the land-use impact issue because, as aforesaid, the Commission does have authority to consider such impacts and has so determined. Re Philadelphia Electric Company, supra; Re West Penn Power Company, supra; and

Re Pennsylvania Power & Light Company, supra. Thus, it is appropriate to consider the asserted land use impacts, excluding alleged property value decreases, in this proceeding.

While it may be correct, as PECO argues, that Protestants' witness Turner's analysis did not include data on property near or abutting the line; that he reviewed only a small portion of the aerial photographs; that he did not know the EMF levels that will be associated with the line; and that the articles relied upon by him stated that transmission lines had no effect on market value, nevertheless the record does contain the direct testimony of many of the property owners along the line on land-use impacts. These witnesses explained that their use of their properties will be significantly changed and limited due to the presence of the line and their fear of potential adverse health effects (N.T. 144-145, 162-163, 166, 188-189, 195, 203-204, 216, 223). Specifically, they testified that due to the fear of potential adverse health effects from exposure to EMFs if the line were energized, they would

(a) move (N.T. 103-107, 138, 154, 234, 245, 261, 267, 279-280, 450, 452, 469);

(b) stay indoors, spend little time outside or in the area (N.T. 138);

(c) would not let children play at a friend's house near the line (N.T. 145-146);

(d) would not let children play down the street or at a friend's house, or swim or visit the friend's house (N.T. 162-163);

(e) would curtail use of the backyard (N.T. 184-188, 277);

(f) would not use outdoor area (N.T. 189);

(g) would spend as much time as possible away from house (N.T. 222-223);

(h) would not use play area for children (N.T. 450-452);

(i) Homeowner's Association would not build playground (N.T. 450-452);

(j) would consider relocating business (N.T. 476);

(k) would not let children play in yard or cul-de-sac (N.T. 485-486, 489-490).

By reason of the foregoing, it appears that energization of the line will impact on land use because of this fear of potential adverse health effects. But, is this a reasonable fear and what can or should be done in light of these two factors, i.e., scientific uncertainty and fear of potential adverse health effects? The Administrative Law Judge believes that the fear of electromagnetic fields as testified to by Protestants, is reasonable in light of the current uncertainty of the scientific research.

To meet this fear, the current approach is found in the concept of "prudent avoidance." This concept initially appeared in a report produced by researchers at Carnegie-Mellon University for the U.S. Office of Technology Assessment in 1989 (PECO Rebuttal Statement No. 5 [Van Dyke] at 8, 15). PECO witness Silva described this concept as follows:

> Prudent avoidance has been suggested as one possible framework for analyzing exposure to electric and magnetic fields, and for considering actions that might alter exposure to electric and magnetic fields. Prudent avoidance incorporates several assumptions from exposure assessment. For example, we do not know which aspect of exposure, if any, is important in discussions of EMF and health. A measure of magnetic field "dose" does not exist; it is not clear if exposure on one day can be added, in some manner, to exposure on another day, or whether short-term high levels of exposure are different from long-term lower levels of exposure. Prudent avoidance also is based on the assumption that health effects from exposure to electric and magnetic fields have not been demonstrated. Prudent avoidance is a concept that recognizes that a scientific determination cannot be made that changes in EMF levels will have any effect on health, and thus prudent avoidance advocates only a modest effort in making such changes.

(PECO Rebuttal Statement No. 6 [Silva] at 15-16)

Witness Silva also stated that when applying the concept of prudent avoidance, it is appropriate to evaluate design features of the transmission facility, the routing and field levels (PECO Rebuttal Statement No. 6 [Silva] at 16). In the instant matter, the witness found all of these considerations

to be consistent with the concept of prudent avoidance (Id. at 17-18). Further, the witness believes that there are no specific procedures or efforts that always must be followed for a project to be consistent with prudent avoidance. In this regard, he stated, inter alia,

> . . . The concept of prudent avoidance is a general framework that has not been codified. It suggests modest efforts to reduce field exposure, and should be understood to be oriented toward that result, rather than toward any required method of achieving that result. The question of what is "modest" will vary depending upon the specific project. Where, as here, the design and routing of the transmission line result in lower fields at modest cost consistent with prudent avoidance, the concept of prudent avoidance does not require that any specific decisional or temporal process must be followed in achieving that result.

(Id. at 18)

He further testified that the concept does not require waiting for the results of ongoing or future research. Instead, he stated, inter alia,

> . . . Prudent avoidance is a concept that allows us to act and move forward while research continues. The authors of the OTA Report have consistently stated that prudent avoidance is designed to help guide action given the current state of scientific knowledge. Delaying projects because of the current state of scientific knowledge thus runs contrary to the basic assumptions of prudent avoidance. To my knowledge, no utility regulatory commission that has evaluated the concept of prudent avoidance has concluded that it requires waiting for further research results.

(Id. at 19)

He further concluded that "(t)he 230 kV project will meet existing field standards in other states, and it has design and routing features consistent with the concept of prudent avoidance" (Id. at 19).

Staff, basing its position in large part on PECO's testimony and on the Carnegie-Mellon brochure, "Electric and Magnetic Fields from 60 Hertz Electric Power: What do we know about possible health risk?",[12] argues, inter alia, that the strategy of prudent avoidance allows transmission lines to go forward in the face of obvious scientific uncertainty. Staff asserts that adoption of prudent avoidance as a policy by the Commission would allow electric utilities to continue building, upgrading and reconstructing electric facilities consistent with an electric utility's obligation to fulfill its statutory duty to furnish and maintain adequate, efficient, safe and reasonable service and facilities for the accommodation, convenience and safety of its employees and the public, citing 66 Pa. C.S. §1501 (Staff Main Brief at 39). Accordingly, Staff favors a prudent avoidance approach on a case-by-case basis whereby an electric utility must use its expertise in system planning, line route and line design to propose a new, upgraded or replacement line which

---

12 This brochure was listed as a reference in the written testimony of Protestants' witness Turner (Protestants' St. 1 at 3, note 2); see also PECO Rebuttal St. 5 at 15.

will allow for reduced levels of electromagnetic field exposure through modest cost efforts. Further, Staff does not favor a "similarity based" approach, as testified to by PECO, to prudent avoidance. Under this approach, the strength of electric and magnetic fields from specific transmission lines, new lines or those being rebuilt or upgraded, must be kept similar to other transmission lines in the same category (PECO Rebuttal Statement No. 6 [Silva] at 18). Staff is opposed to this approach ". . . because of the potential for utilities to do only what is required to meet the upper exposure limit for any given line" (Staff Main Brief at 40). Staff further opposes the charging of an exposure fee because it would not reduce the amount of EMF exposure to people living near the line and would result in increased rates for ratepayers (Id. at 41). Staff also argues that utility application of prudent avoidance principles does not translate into an admission by the utility that EMF is an established health risk (Id. at 44) and that considering the totality of the circumstances, the line at issue is consistent with the principles of prudent avoidance (Id.).

OCA also comments on the concept of "prudent avoidance," but discusses it in terms of what constitutes prudent public policy (OCA Main Brief at 43 et seq.), and submits that given the uncertain risk associated with electric and magnetic fields, the utilities must implement a prudent policy and the

Commission should provide guidance in this area. OCA summarizes the elements of its recommended prudent policy as follows:

1. Research on the effects of electric and magnetic fields should be continued.

2. The public should be informed about possible health effects proactively, impartially, and regularly.

3. The public should be involved in critical decision making processes from the beginning.

4. The cost and benefits of possible alternatives should be calculated before any construction decisions are made.

5. Err on the side of safety, but not without considering the cost.

(OCA Statement No. 2 [Rosenbaum] at 8)

OCA emphasizes that utilities should engage in the foregoing processes before transmission lines are designed, sited and constructed, and costs and benefits of mitigative measures should be considered. In the instant matter, OCA argues, PECO did not pursue these steps before the design and construction of the line. Thus, OCA asserts, the residents had no opportunity to ascertain whether PECO had employed all reasonable design alternatives. Accordingly, OCA submits that PECO's approach was inappropriate and should be discouraged by the Commission.

Protestants argue that the testimony supports the conclusion that prudent avoidance calls for a delay in the energization of the line because EMFs have been shown to have

adverse health and biological effects (Protestants' Reply Brief at 19-20). Protestants further argue that prudent avoidance should not be achieved in a happenstance manner, but must be exercised before siting, design and construction decisions (Id. at 21). Protestants further assert that PECO's distribution of materials referencing prudent avoidance is an admission that EMF is an established safety risk (Protestants' Main Brief at 8-9); Protestants' Reply Brief at 21). Accordingly, Protestants argue that PECO did not practice prudent avoidance in the siting, construction and design of the line (Protestants' Reply Brief at 22-28).

The Administrative Law Judge has carefully considered the record evidence and the arguments of the parties with respect to the concept of prudent avoidance. There is no disagreement that such a policy should be practiced. Protestants argue, inter alia, that prudent avoidance requires delaying energization of the line. PECO asserts, inter alia, that the line meets existing field standards in other states and that its design and routing features are consistent with the concept of prudent avoidance. Staff urges, inter alia, a prudent avoidance policy on a case-by-case basis, opposes a "similarity based" approach and an exposure fee requirement, and contends, as PECO, that the line is consistent with the principles of prudent avoidance. OCA urges the Commission to adopt a prudent public policy approach under

which research should be continued, the public should be informed about health effects and should be involved in critical decision-making processes, costs and benefits should be calculated before construction decisions are made and err on the side of safety, but not without considering the cost.

At the outset, the Administrative Law Judge is not persuaded that dissemination of information concerning prudent avoidance constitutes an admission by PECO that EMFs are a safety risk. Rather, the concept of prudent avoidance, as admitted by Protestants' witness Turner, is an interim strategy for use during times of "uncertainty" (N.T. 639-641). Thus, it appears that prudent avoidance recognizes that a conclusive scientific determination has not been made.

While it is correct that prudent avoidance procedures should be investigated and analyzed before transmission lines are designed, sited and constructed, as advocated by OCA and Protestants, the record evidence in this proceeding as to the results achieved by the selection of design and route and field levels cannot be ignored in ascertaining whether the line comports with available existing standards by which prudent avoidance can be judged, absent (as in this case) State-mandated EMF standards. Prior planning, investigation and consideration should be practiced, but, as aforesaid, ultimate results cannot be overlooked.

With regard to the routing of the line, PECO's testimony indicates that the routing was considered, but not in a formal fashion, prior to making construction decisions (N.T. 11, 19-20, 31). Thus, PECO points out that the chosen route along the existing utility corridor was a near-linear route between the substations, did not require acquisition and creation of new utility right-of-way, allowed use of the existing transmission poles from the Conrail 138 kV line, and was consistent with the Commission's past approval of the common corridor approach. PECO asserts that these considerations were "obvious" and therefore did not require a formal evaluation (N.T. 31).

Further, it must be noted that the record testimony discloses that the Woodbourne-Heaton Line was not routed through a high density urban area (PECO Rebuttal Statement No. 5 [Van Dyke] at 11). This relatively low population density exists because the land uses and zoning in the corridor developed near the existing Conrail corridor (Id. at 12-15) and its use avoids the creation of a new utility corridor (PECO Rebuttal Statement No. 6 [Silva] at 17).

As to design, the testimony indicates that the compact delta design used resulted in lower field levels that would be associated with other designs (PECO Statement No. 2 [Boeggeman] at 12-13). In addition, the line design incorporates "phase rolls" which control current imbalance on the line and thus

results in lower field levels (PECO Rebuttal Statement No. 6 [Silva] at 17), and the line incorporates the increasing of ground clearances above required levels (PECO Rebuttal Statement No. 4 [Rosenberg] at 7; PECO Statement No. 1 [Oedemann] at 10). This evidence was uncontroverted and unchallenged. Thus, the record testimony does disclose that the routing and design do result in the lowest fields (PECO Statement No. 1 [Oedemann] at 12-13).

Although calculations of the electric and magnetic fields resulting from the design choice were not done until after construction of the line was almost completed (N.T. 12-13; OCA Cross-Exam. Exh. 1; OCA Statement No. 2 [Rosenbaum] at 7), OCA witness Rosenbaum checked the calculations and found them to be correct (N.T. 351). Moreover, PECO witness Oedemann testified that the design was considered prior to making construction decisions (N.T. 11, 19-20, 31).

Further, while not necessarily the sole criterion by which to judge whether field levels are consistent with the concept of prudent avoidance, it should be noted that the uncontroverted record testimony indicates that the fields which will be associated with the line are not materially different from other 230 kV transmission lines already in operation in Pennsylvania and throughout the United States, and are lower than the New York and Florida standards (PECO Rebuttal Statement No. 6

[Silva] at 18). That is not to say that this alone would be sufficient to comport with prudent avoidance, but it does provide some guidance as to regulatory standards elsewhere in light of the current state of scientific research and when viewed together with all other relevant "prudent avoidance" measures, it does provide a relevant check on utility planning in this case. In the instant matter, taking into consideration all of the foregoing, and in the absence of promulgated standards in Pennsylvania, the line design is consistent with the principle of prudent avoidance. Thus, with respect to routing, population density and design choice, even on the less desirable hindsight approach, and without State-mandated field standards, the actions of PECO, as far as they go, appear to factually support compliance with the concept of prudent avoidance because of the results obtained. However, since prudent avoidance encompasses at least modest efforts to reduce field exposure (PECO Rebuttal Statement No. 6 [Silva] at 15-19), and in light of the reasonable fear of potential adverse health effects and actual land use effects due to the current scientific uncertainty concerning EMFs, the Administrative Law Judge agrees with the OCA that the public's concerns should not be summarily ignored or dismissed (OCA Statement No. 1 at 1, 10 and OCA Statement No. 2 at 10), and therefore recommends that the Commission establish and adopt reasonable regulations that set EMF standards, including

regulation of the strengths of electromagnetic fields at the edge of power line rights of way; and that pending the adoption of such standards by the Commission, and demonstrated compliance therewith, energization of the line should be temporarily delayed. This course of action would have multiple benefits, i.e., adoption and compliance with field standards would serve in some measure to alleviate fear of potential health effects, lessen actual effects on land-use (and perceived effects on property values, if any there be), while not unduly prejudicing PECO, if indeed the field levels do comport with standards adopted in other jurisdictions as PECO has testified. This course of action, thus, would be consistent with, and would promote and enhance the concept of prudent avoidance.

Before leaving the subject of prudent avoidance, it should be noted that OCA urges, that in view of the inconclusive nature of the scientific research to date, an appropriate public policy should be developed because of the growing public concern. It should be further noted that development of a prudent public policy is within the province of the legislature and the Commission to formulate and enunciate after careful consideration of all relevant factors. Thus, OCA suggests, and the Administrative Law Judge agrees, that in the formulation of such a prudent public policy, the following elements should be considered (OCA Statement No. 2 [Rosenbaum] at 8),

1. Continued scientific research;

2. Regular public information promulgation;

3. Public involvement in decision-making;

4. Calculation of costs and benefits prior to making construction decisions;

5. Err on the side of safety, but not without considering the cost.

OCA also stresses that some of the mitigative measures which should be considered before construction are (OCA Statement No. 2 [Rosenbaum] at 7):

1. Avoiding heavily populated areas;

2. Avoiding parks, schools and other public facilities;

3. Widening rights-of-way;

4. Limiting public uses of rights-of-way;

5. Using higher ground clearances;

6. Designing power lines to reduce fields.

These suggestions, while not specifically dealing with the remanded issue in this proceeding, are set forth in order to present a comprehensive picture to aid the Commission in developing its policy approach to the problem.

VI. CONCLUSIONS OF LAW

1. The Commission has jurisdiction over the parties and the subject matter of this proceeding.

2. Philadelphia Electric Company's Letter of Notification relative to reconstructing and rebuilding of the existing 138 kV line to operate as a Woodbourne-Heaton 230 kV Line in Montgomery and Bucks Counties was approved by Commission Order on February 9, 1990 (February 1, 1990 Commission Order at 4).

3. By that Order, the Commission found and concluded that the Woodbourne-Heaton kV transmission line complied with existing siting safety regulations. 52 Pa. Code §§57.71 et seq.; 57.72-76.

4. The preponderance of the record evidence in this proceeding does not support a finding or conclusion that there is a definite causal connection between exposure to EMFs and adverse human health effects because of the inconclusive nature of scientific research and studies presented in this proceeding, when viewed in totality.

5. The record evidence in this proceeding supports a finding and conclusion that adjoining property owners will limit their use of their properties by reason of their fear of exposure to EMFs from the Woodbourne-Heaton line.

6. The Commission does not have jurisdiction to assess and/or award damages due to alleged decreases in property market values.

VII. ORDER

THEREFORE,

IT IS ORDERED:

1. That the Protest of Petitioners be and the same is denied in part and sustained in part consistent with Discussion, Findings of Fact and Conclusions of Law set forth in the Initial Decision.

2. That by reason of the inconclusive nature of scientific research and studies to date, the Protest is dismissed in part insofar as it seeks a determination that exposure to EMFs causes adverse human health effects.

3. That insofar as the Protest seeks a determination that energization of the Woodbourne-Heaton Line at this time will result in adverse land-use impacts by reason of the fear of potential adverse human health effects, the Protest is sustained in part.

4. That pending consideration by the Commission of the recommended adoption and implementation of EMF standards, including regulation of the strengths of electromagnetic fields at the edge of rights of way of high tension lines and demonstrated compliance therewith in order to further comport with the principle of prudent avoidance in this matter, and thus provide a reasonable basis for minimizing the perceived fear and adverse land-use impacts, energization of the Woodbourne-Heaton

impacts, energization of the Woodbourne-Heaton Line should be temporarily delayed until the further Order of the Commission.

July 29, 1992
Date

Herbert Smolen
HERBERT SMOLEN
Administrative Law Judge

RECEIVED
AUG 21 1992
Public Utility Commission
Secretary's Bureau
Information Control Division
AMH

THIS 21st DAY OF August, 1992

THE UNDERSIGNED HEREBY ACKNOWLEDGES RECEIPT OF
COPY OF INITIAL DECISION

UNDER DATE OF AUGUST 19, 1992 IN DOCKET NUMBER A-110550F055

IN BEHALF OF OFFICE OF CONSUMER ADVOCATE
TANYA MCCLOSKEY ESQUIRE

Tanya McCloskey

Kindly sign and date this form and return to: PUC-FILE ROOM
B-20
NORTH OFFICE BUILDING
HARRISBURG PA

DOCUMENT
FOLDER

THIS Twentieth DAY OF August

THE UNDERSIGNED HEREBY ACKNOWLEDGES RECEIPT OF

COPY OF INITIAL DECISION

UNDER DATE OF AUGUST 19, 1992 IN DOCKET NUMBER A-110550F055

IN BEHALF OF PUC LAW BUREAU

PATRICIA KRISE BURKET ESQUIRE

RLS

Kindly sign and date this form and return to: PUC-FILE ROOM
B-20
NORTH OFFICE BUILDING
HARRISBURG PA

Patricia Krise Burket

DOCUMENT FOLDER

RECEIVED
AUG 20 1992
Pa. P.U.C.
Law Bureau

COMMONWEALTH OF PENNSYLVANIA
Public Utility Commission
September 15, 1992

SUBJECT: A-110550F055; Letter Notification of Philadelphia Electric Company relative to reconstructing and rebuilding of the existing 138 kv line to operate as the Woodbourne-Heaton 230 kv line in Montgomery and Bucks Counties

TO: John G. Alford
Secretary

FROM: Cheryl Walker Davis, Director
Office of Special Assistants

Pursuant to the requirements of Act 294, (66 Pa. C.S. §332(h)), September 14, 1992 have requested full review of the Administrative Law Judge's Initial Decision in the above captioned proceeding. The second request for review was dated .

Please notify the Office of Administrative Law Judge to prepare the case for consideration at a future Public Meeting.

DOCKETED
OCT 01 1992

exep + replies filed

NVL

FOLDER

Act 294

Case Identification:	A-110550F055; Letter Notification of Philadelphia Electric Company relative to reconstructing and rebuilding of the existing 138 kv line to operate as the Woodbourne-Heaton 230 kv line in Montgomery and Bucks Counties
Initial Decision By:	ALJ Herbert Smolen
Deadline for Return to OSA:	September 2, 1992

This decision has not been reviewed by OSA.

* * * * * *

I want full Commission review of this decision.

Commissioner _____ Date 9-7-92

I do not want full Commission review of this decision.

_____ Commissioner _____ Date

Act 294

Case Identification: A-110550F055; Letter Notification of Philadelphia Electric Company relative to reconstructing and rebuilding of the existing 138 kv line to operate as the Woodbourne-Heaton 230 kv line in Montgomery and Bucks Counties

Initial Decision By: ALJ Herbert Smolen

Deadline for Return to OSA: September 2, 1992

This decision has not been reviewed by OSA.

* * * * * *

I want full Commission review of this decision.

✓ Joseph Rhodes, Jr. 9/14/92
Commissioner Date

I do not want full Commission review of this decision.

Commissioner Date

B

Act 294

Case Identification:	A-110550F055; Letter Notification of Philadelphia Electric Company relative to reconstructing and rebuilding of the existing 138 kv line to operate as the Woodbourne-Heaton 230 kv line in Montgomery and Bucks Counties
Initial Decision By:	ALJ Herbert Smolen
Deadline for Return to OSA:	September 2, 1992

This decision has not been reviewed by OSA.

RECEIVED
AUG 21 1992
COMMISSIONER HOLLAND

* * * * * *

I want full Commission review of this decision.

_____ _____
Commissioner Date

I do not want full Commission review of this decision.

Kendall F. Holland 8/18/92
Commissioner Date

Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101-1179 • 215/774-5151

Jesse A. Dillon
Attorney
215/774-5013

FAX: 215/774-6726

September 8, 1992

RECEIVED
SEP 08 1992
SECRETARY'S BUREAU

Mr. John G. Alford, Secretary
Pennsylvania Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105-3265

Re: Letter of Notification of Philadelphia Electric Company Relative To Reconductoring and Rebuilding The Existing Line To Operate As A Woodbourne-Heaton 230 kV Line In Bucks and Montgomery Counties, Docket No. ~~A-110500F055~~

A-110550, F0055

Dear Secretary Alford:

Enclosed for filing is an original and nine (9) copies of Pennsylvania Power & Light Company's Exception in the above-referenced matter. As shown on the certificate of service attached to the document, copies have been served on all parties of record.

Respectfully submitted.

Jesse A. Dillon

DOCUMENT FOLDER

Enclosures

ORIGINAL

RECEIVED
SEP 08 1992
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU
Information Control Division

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

LETTER OF NOTIFICATION OF
PHILADELPHIA ELECTRIC COMPANY RELATIVE
TO RECONDUCTORING AND REBUILDING THE
EXISTING LINE TO OPERATE AS A WOODBOURNE-HEATON
230 kV LINE IN BUCKS AND MONTGOMERY COUNTIES

Docket No. A-110500F055

EXCEPTION OF
PENNSYLVANIA POWER & LIGHT COMPANY
TO THE INITIAL DECISION OF
ADMINISTRATIVE LAW JUDGE HERBERT SMOLEN
ISSUED AUGUST 19, 1992

DOCKETED
SEP1 4 1992

Jesse A. Dillon
Pennsylvania Power & Light Company
Two North Ninth Street
Allentown, Pennsylvania 18101
(215) 774-5013

Attorney for Pennsylvania Power &
Light Company

Dated: September 8, 1992

DOCUMENT

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I. Introduction

Below is the Exception of Pennsylvania Power & Light Company ("PP&L") to the Initial Decision ("I.D.") of Administrative Law Judge Herbert Smolen (the "ALJ") in this proceeding involving Philadelphia Electric Company's ("PECO") Woodbourne-Heaton 230 kV line located in Bucks and Montgomery Counties ("Woodbourne-Heaton Line"). In his decision, the ALJ held that:

- The scientific studies on electric and magnetic fields ("EMF") and human health are inconclusive, and the record evidence does not support a finding that EMF exposure is harmful to human health.
- Energization of the line will cause protestants to limit the use of their properties due to their fear of potential adverse human health effects of EMF.
- Pending consideration by the Pennsylvania Public Utility Commission ("Commission") of the adoption and implementation of EMF standards, including maximum EMF levels at the edge of the right-of-way and demonstrated compliance with such standards to further comport with principles of prudent avoidance, the Woodbourne-Heaton Line should not be energized.

- The Commission should consider modification of its transmission line siting regulations to provide notice to adjoining landowners and to clarify when a Letter of Notification may be filed in lieu of a full application.

PP&L, as an intervenor who has been present throughout this proceeding, agrees with substantial portions of the ALJ's decision, and PP&L is not submitting extensive exceptions that PP&L expects would duplicate the efforts of PECO or other parties to this proceeding. Instead, PP&L is filing a single exception objecting to the relief ordered by the ALJ and to a portion of the basis of his reasoning for ordering such relief. PP&L also is proposing an alternative solution to the relief ordered by the ALJ.

PP&L follows the EMF issue closely and has led the way in establishing a comprehensive EMF policy which includes support for EMF research, EMF public communications materials, an EMF Management Program, EMF measurements, and extensive, early public involvement in the transmission line siting process. For these reasons, PP&L believes that it may be able to provide useful input on this extremely complex issue.

II. Exception

PP&L excepts to the ALJ's decision to delay energization of the Woodbourne-Heaton Line until such time as the Commission considers the adoption and implementation of EMF standards, including edge of right-of-way EMF standards.

III. Argument

A. PP&L Agrees With Several Key Findings of the ALJ

At the outset, it should be noted that this is a very complicated case which involves highly specialized and extremely technical areas of engineering, science, medicine and public policy. Further, although PP&L disagrees with the result reached by the ALJ, PP&L agrees with the ALJ on several key points. In order to fully understand PP&L's exception to the ALJ's decision, these points of agreement must be explained.

1. PP&L Agrees that the Evidence Does Not Support a Finding that EMFs are Harmful to Human Health

First, PP&L agrees with the ALJ's finding that the evidence does not support a finding that exposure to EMFs is harmful to human health. I.D. at 178-79, 211.

As PP&L explained at length in its Main Brief in this proceeding, science has not demonstrated that EMFs pose a human health hazard despite the questions that have been

raised about the health effects of EMFs. Neither generally accepted scientific reasoning (See PP&L M.B., pp. 9-42) nor the numerous independent and governmental scientific panels which have reviewed the scientific literature on EMFs (See PP&L M.B., pp. 43-45) support protestants' assertion that EMFs pose a human health hazard. The ALJ properly decided that there is insufficient evidence upon which to conclude that EMFs pose any human health hazard, and the Commission should affirm such conclusion.

2. PP&L Agrees that the Public Concerns Over EMFs Should Not Be Summarily Ignored or Dismissed

Second, PP&L concurs with the ALJ's finding that despite the fact that science has not demonstrated that EMFs pose a human health hazard, the general public's concerns about possible human health hazards from EMFs "should not be summarily ignored or dismissed." I.D. at 207.

This principle, namely that the public's concerns over possible, but unproven and undemonstrated, human health effects from EMF exposure should not be ignored and must be addressed, is the driving force behind PP&L's comprehensive EMF policy which has evolved since the mid-1970's. The elements of PP&L's EMF policy are similar to the elements of the "prudent policy in the face of uncertainty" proposed by OCA in this proceeding. I.D. at 201-02; OCA St. No. 2,

pp. 6-8. The ALJ properly concluded, as a general matter, that the public's concerns about EMFs should not be summarily ignored or dismissed, and the Commission should affirm such finding.[1/]

B. PP&L Disagrees With the ALJ's Proposed Solution to Addressing the Public's Concerns Over EMFs

Despite the significant areas of agreement between PP&L and the ALJ that are explained above, PP&L disagrees that the ALJ crafted the correct solution to the difficult question of how best to address the public's concerns over EMF. The ALJ directed that energization of the Woodbourne-Heaton Line not be permitted pending the consideration by the Commission of regulations setting EMF standards, including, but not limited to, maximum EMF levels at the edge of rights-of-way. I.D. at 207-09; 211-12. The ALJ justifies

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1/ It should be noted, however, that although PP&L agrees that the public has reasons to be concerned about EMF, PP&L does not concur with the ALJ that "fears" of EMF health effects are necessarily "reasonable" in light of the available scientific evidence. Further, PP&L disagrees with the ALJ that "actual land use effects" should be allowed to prevent energization of the Woodbourne-Heaton line. See I.D. at 207.

his action by stating that this course of action would "alleviate fear of potential health effects" and "lessen actual effects on land use." I.D. at 208.

As explained below, there are several reasons why PP&L disagrees with the ALJ's proposed solution.

1. EMF Edge of Right-of-Way Standards Will Not Address the Public's Concerns Over Potential Health Hazards From EMFs

First, it must be understood that the types of EMF standards apparently intended by the ALJ's decision are what are known as "similarity-based" EMF standards, such as those enacted in New York and Florida. I.D. at 129. Under a similarity-based approach, discussed at some length by the ALJ, edge of right-of-way standards are set based on the highest EMFs from other existing transmission lines of the same voltage category. I.D. at 129. The ALJ states very clearly that there is no basis upon which to find that EMFs pose any human health hazard (I.D. at 178-79), and therefore, the ALJ cannot intend for the Commission to prescribe human health-based EMF standards at this time. As the ALJ recognized, similarity-based EMF standards recognize the assumption that what aspect of EMF exposure which may be important for human health, if any, is not known. I.D. at 129.

In fact, there could be no other supportable basis upon which to set EMF standards other than a similarity-based approach, given the uncertainty that presently exists regarding possible health effects. The only other way to set standards would be to choose arbitrary EMF levels which would be totally and absolutely devoid of scientific support. Any such standards would be, by their nature, arbitrary and capricious, would constitute an obvious abuse of discretion, and are clearly not intended by the ALJ.

The ALJ also recognizes that existing high voltage transmission lines, upon which similarity-based standards would be based, have typical magnetic field levels in the range of 20 to 140 milligauss and maximum values up to 350 milligauss. I.D. at 129. However, what the ALJ fails to recognize is that similarity-based EMF edge of right-of-way standards set at, for example, 150 to 200 milligauss, such as the New York and Florida standards, simply will not address the EMF concerns of the public at large or the concerns of the protestants in this proceeding.

For instance, there is testimony by the protestants in this proceeding that "2-1/2 to 5 milligauss would be

safe."[2/] I.D. at 36. These types of statements can also be found in some of the popular literature on EMFs and are, unfortunately, misleading. The ALJ also found that the majority of the protestants, who are obviously concerned about EMFs, have garnered their information about EMFs and possible adverse health effects from popular literature such as television, newspapers, magazines and literature distributed by groups opposed to transmission lines. I.D. at 132.

Similarity-based EMF standards, which set edge of right-of-way magnetic field standards at 150 milligauss or even higher, simply will not address the concerns of persons who believe, albeit erroneously, that EMFs have been proven to cause adverse health effects at levels as low as 2-1/2 milligauss and who rely on popular (and often incomplete or misleading) media for information regarding this highly technical subject.

Further, the existence of similarity-based standards could also lead the public to believe, erroneously, that the Commission had thoroughly examined the science and

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2/ Although this lay "testimony" is in the record, PP&L wishes to be clear that, as noted by the ALJ, there presently is insufficient scientific evidence to conclude that any exposure to EMFs from power lines poses any human health hazard. Therefore, there is no basis for any conclusion that any particular level of exposure would necessarily be "unsafe" or that other particular levels of exposure would necessarily be "safe."

determined "safe" levels before setting the standards. The public could get this impression even if the Commision attempts to explain that the standards merely maintain the status quo. Therefore, setting similarity-based standards could potentially lead to an increased sense of security among members of the public regarding EMF levels below the standards, and such an increased sense of security is not justified given the state of EMF science.

2. EMF Edge of Right-of-Way Standards Cannot Be Based in Science, Merely Maintain the Status Quo and are Unnecessary

Because there is no sufficient scientific basis for concluding that exposure to EMFs poses a human health hazard, EMF edge of right-of-way standards cannot be based on science and merely maintain the status quo for EMF levels in new construction. On the other hand, mandating that utilities adopt a EMF management program, such as that currently in place at PP&L, probably will result in new or rebuilt transmission lines being constructed with exposures to EMFs even lower than those present on similar existing transmission lines.

For this reason, a field management approach to new transmission lines consistent with principles of "prudent avoidance" goes further toward addressing the concerns of

the public than would any similarity-based EMF standards which cannot be based in science, and which merely maintain the status quo. Similarity-based EMF standards which preserve the status quo are simply unnecessary if utilities follow EMF management practices in the construction of new or rebuilt transmission lines.

3. Several Other States Have Considered and Rejected EMF Edge-of Right-of-Way Standards

Pennsylvania is not the first state to be faced with the question of whether to adopt similarity-based EMF standards. As noted by the ALJ, New York and Florida have adopted similarity-based EMF standards at the edge of the right-of-way. New York's standards for magnetic fields are 200 milligauss at the edge of the right-of-way for lines greater than 125 kV. Florida's standards for magnetic fields are 200 milligauss at the edge of the right-of-way for single circuit 500 kV lines, 250 milligauss at the edge of the right-of-way for double circuit 500 kV lines and 150 milligauss at the edge of the right-of-way for lines of 230 kV or less. These are the only states which have adopted standards for magnetic fields, which are the subject of the current concerns about health effects.[3/]

3/ It should be noted that several states do have standards for electric fields, but electric fields are not the subject of current concerns about health effects.

However, several other states have rejected the concept of edge of right-of-way standards. As an example, the Colorado Public Utilities Commission only last month decided to reject any further consideration of the Florida EMF standards (which it had proposed in a rulemaking proceeding), finding them to give a "mistaken appearance of precision in this area." The Colorado Commission decided to instead pursue only a "reasonable and flexible standard of prudent avoidance." In the Matter of The Rules for Electric Utilities of the Colorado Public Utilities Commission, 4 Code of Colorado Regulation, 723-3, Concerning Electric and Magnetic Fields, Docket No. 92R-259E (Adopted July 31, 1992).

In March of this year, the Texas Public Utility Commission's EMF Health Effects Committee concluded that neither the Texas Commission nor other Texas state agencies "should attempt to set EMF standards through guidelines, regulations or legislation." Health Effects of Exposure to Power lines - Frequency Electric and Magnetic Fields, Electro-Magnetic Health Effects Committee, Public Utility Commission of Texas (March 1992), p. xxi. The Texas report noted that "the majority of states have determined after their own research, or based on reports from experts, that the most appropriate response at this time is to defer any

standard setting activity..." Id. at pp. 6-8. Further, the Texas report stated as follows:

> The Committee has reviewed various state EMF standards. However, the use of numbers for an arbitrary standard in the absence of scientific justification sets a de facto risk level which is not supported by available evidence. Use of such numbers, which is strictly political, can generate a false sense of security, diverting resources from evaluating a genuine risk associated with some other environmental factor. Id. at p. xxi.

Even as early as September of 1989, the California Public Utilities Commission, in a report to the California State Legislature, concluded that there were numerous problems with setting any kind of EMF standards and concluded that setting EMF standards would be premature and inappropriate. Potential Health Effects of Electric and Magnetic Fields from Electric Power Facilities, California Public Utility Commission (September 15, 1989), pp. B-4, C-20-23.

4. The ALJ's Refusal to Permit Energization of the Line Despite Explicit Findings that the Line Complied With Principles of "Prudent Avoidance" was Unreasonable

It is important to note that the ALJ directed that the Woodbourne-Heaton Line not be energized despite making numerous findings regarding compliance with the concept of "prudent avoidance," a framework for analyzing actions relating to EMFs in light of the scientific uncertainty. I.D. at 198-199. The ALJ found as follows:

1. The chosen route for the line was along an existing utility corridor, was a near-linear route, did not require acquisition and creation of new utility rights-of-way, allowed use of the existing transmission poles from the Conrail 138 kV line, and was consistent with the Commission's past approval of the common corridor approach (I.D. at 205);
2. The line was not routed through a high population density urban area, and was actually routed through a relatively low population density area (I.D. at 205);
3. The use of the existing Conrail corridor avoids the creation of a new utility corridor (I.D. at 205);
4. The compact delta design and "phase rolls" used resulted in lower magnetic field levels than would be associated with other designs (I.D. at 205-06);
5. The line incorporates the increasing of ground clearances above existing levels (I.D. at 206);
6. The routing and design "do result in the lowest fields" (I.D. at 206); and

7. The levels of EMFs from the line are not materially different from EMFs from other 230 kV transmission lines already in operation and are lower than the New York and Florida field standards (I.D. at 206).

After making these findings, the ALJ concluded that with respect to routing, population density and line design, the facts support an ultimate conclusion that, in addition to meeting the safety standards established by the National Electrical Safety Code (I.D. at 134), the Woodbourne-Heaton Line complied with the concept of "prudent avoidance." I.D. at 207.

Despite all of these findings, however, the ALJ refused to permit PECO to energize the Woodbourne-Heaton Line. PP&L cannot think of any other findings that possibly might be made with regard to an after-the-fact review of compliance with policy of "prudent avoidance". Therefore, no purpose is served by delay of energization of this line, given these extensive findings by the ALJ.

5. Although Public's Concerns Over EMF Must Be Considered, the Statements and Concerns of the Protestants in This Case Do Not By Themselves Provide a Sufficient Basis for Preventing Energization of the Woodbourne-Heaton Line

The ALJ based his action on the premise that the protestants would change their "use" of their properties adjacent to the right-of-way because of the presence of the line and their concerns about EMFs. I.D. at 196-97. There are several problems with this approach.

First, although the Commission, in the past, may have decided to consider effects on individual owners' use of property in deciding siting applications (I.D. at 195-96), any such effects were merely considered along with a whole host of other factors such as need, reliability, cost, alternative routes and so on, which are not presently before the Commission or the ALJ in this proceeding due to the unusual procedural history of this proceeding. Any consideration of "use" of a property cannot be made in the abstract but should be viewed against the totality of factors in a siting proceeding, most of which have already been decided by the Commission in this case. Public concerns alone, although they may be relevant, cannot form the sole basis for action in a line siting proceeding or for setting regulatory policy. Both individual line siting proceedings and development of sound regulatory policy require a careful

balancing of all factors to arrive at decisions which are in the public interest.

Second, if all a property owner needs to show in a siting proceeding is that he will somehow change the use of his property as a result of the transmission line and that such change in use should prevent a siting application from being approved, then virtually no transmission line siting applications could ever be approved because there could be changes in "use" in even the most innocuous line siting cases.

6. The ALJ's Initial Decision, if Adopted by the Commission, May Create a De Facto Moratorium on Transmission Line Siting and Construction Which Could Have Significant Adverse Effects

Finally, PP&L is concerned that the ALJ's decision, if adopted by the Commission, may create a de facto moratorium on transmission line siting and construction which could have significant adverse impact on electric utilities, their customers, and others.

If the Commission delays energization of this line and begins what could be a lengthy rulemaking proceeding, such action could have the effect of effectively delaying approval of any transmission line siting proceedings already filed and creating substantial uncertainty regarding any transmission lines filed for siting approval in the near

future. PP&L currently is preparing numerous line siting applications or letters and has several other line siting applications or letters presently pending before the Commission. Any protestants in these other proceedings or potential proceedings probably will argue that pending the outcome of the suggested rulemaking proceeding, the Commission should not decide their cases under the ALJ's logic for delaying energization of the Woodbourne-Heaton Line.

Such a de facto moratorium would have several adverse results. First, electric utilities in the Commonwealth have a duty to provide customers with reasonably adequate electric service (66 Pa.C.S. § 1501), and any delays in construction of new transmission lines can adversely affect an electric utility's ability to provide reasonably adequate service to its customers.

Second, as recognized by other state utility commissions, during any de facto moratorium on the siting for construction of new lines, it is likely that loads on existing transmission lines, and even distribution lines, could increase significantly. See, e.g., Re Advance Plans for Construction of Facilities, 132 P.U.R. 4th 193, 195-96 (Wisconsin P.S.C. 1992). As was shown in this proceeding, any increase in loading (amperage) on transmission or distribution lines actually increases magnetic fields produced

by the lines. PECO Reb. St. No. 6, p. 10. Therefore, a moratorium, even if a de facto one during the pending of a rulemaking proceeding, could actually increase the public's exposure to magnetic fields, a wholly unintended result.

7. Conclusion as to the ALJ's Proposed Solution to Addressing the Public's Concerns About EMF

For all of these reasons, PP&L concludes that concerns over EMF in this case do not provide a sufficient basis for preventing energization of the Woodbourne-Heaton Line and do not provide support for the suggestion to adopt edge of right-of-way EMF standards. However, as explained below in the remainder of PP&L's exceptions, PP&L believes strongly that the public's real concerns about EMF do justify the resolution proposed by PP&L.

C. PP&L Proposes An Alternative Solution to Addressing the Public Concerns Over EMFs

As explained above, despite PP&L's disagreement with the ALJ over the solution chosen by the ALJ, PP&L believes that the record in this case demonstrates that the time has come for this Commission to act to address the public's concerns about EMFs. Specifically, PP&L proposes that, in lieu of the action recommended by the ALJ, the Commission take the following actions based on the record in the PECO case:

- Permit PECO to energize the Woodbourne-Heaton Line without further delay based on, among other things, the ALJ's extensive findings that the line meets standards of "prudent avoidance."

- Institute either a policy statement proceeding or a rulemaking proceeding to mandate that all electric utilities in the Commonwealth adopt a comprehensive EMF policy as explained below.

- Expressly state that any transmission line siting proceeding either currently pending or filed before the final promulgation of the policy statement or regulations, will not be delayed but will be decided on its individual merits as is current Commission practice.

1. Elements of the Mandated Comprehensive EMF Policy Proposed by PP&L

Specifically, as part of its order in this case, the Commission should open either a rulemaking proceeding or a policy statement proceeding in which the Commission would mandate that all utilities institute a comprehensive EMF policy. This mandated comprehensive EMF policy would be directly aimed at addressing the very real, significant public concerns over EMF instead of attempting to set either similarity-based or arbitrary EMF standards. The comprehensive EMF policy mandated by the Commission should consist of the following elements:

Support for EMF Research

-- Electric utilities, through support of the Electric Power Research Institute (EPRI) and other means, shall support research into EMFs,

EMF management and reduction technologies and possible health effects of EMFs.

Dissemination of EMF Information

-- Electric utilities shall prepare and make available to the public easily understandable information about EMFs and the results of research into possible human health effects of EMF. Electric utilities shall regularly update these materials as new scientific evidence becomes available.

Provision of EMF Measurements

-- Electric utilities shall provide or arrange for EMF measurements for any customers or affected property owners who request such measurements.

Establishment of EMF Management Plan

-- Electric utilities shall establish flexible plans for reducing EMFs and exposure to EMFs at low cost or no cost, where practicable, in new or reconstructed transmission lines. An electric utility's EMF Management Plans shall include, at a minimum, the following elements: consideration of transmission line design and construction techniques which could reduce EMFs at low or no cost, such as alternative line configurations and higher ground clearances, and consideration of population density and location of public facilities in the route selection and evaluation process. Electric utilities shall include in all siting applications and letters of notification information explaining application of their EMF Management Plans.

Involvement of the Public in the Transmission Line Siting Process

-- Electric utilities shall involve the public directly at each stage of the transmission line siting process, namely the gathering of data, the selection of alternative routes and the selection of preferred routes. EMFs and EMF Management Plans and techniques shall be considered and discussed with the public at all stages of the siting process.

2. The Mandated EMF Policy Proposed by PP&L More Closely Addresses Public Concerns Over EMFs Than Does the ALJ's Recommended Solution

The mandated EMF Policy proposed by PP&L would go further toward addressing the public's concerns over EMFs than would any EMF edge of right-of-way standards. PP&L's proposed solution would ensure that utilities are taking steps designed to address the public's concerns in a positive way through research, communications, measurements and field management and to involve the public in the decision-making process through mandated, early involvement in the siting process. EMF edge of right-of-way standards, presumably similarity-based, simply do not go as far in addressing the public's concerns as does PP&L's proposed solution.

This approach of mandating prudent EMF policies to be pursued by electric utilities has been employed by other states in an attempt to address EMF concerns. For instance, the Wisconsin Public Service Commission recently rejected calls for a moratorium in favor of expansion of its previously mandated prudent EMF measures. See, e.g., Re Advance Plans for Construction of Facilities, 138 P.U.R. 4th 193 (Wisconsin P.S.C. 1992) Further, adoption by the Commission of a mandated EMF policy for electric utilities would establish some level of uniformity among utilities in the Commonwealth. While some electric utilities are already undertak-

ing all of the suggested elements of the mandated EMF Policy, other electric utilities may be undertaking only some of these steps. A mandated statewide policy would provide uniformity and guidance as to which EMF-related actions electric utilities in the Commonwealth should pursue.

3. The Mandated EMF Policy Proposed by PP&L is Consistent With the Principle of "Prudent Avoidance"

PP&L intentionally has avoided the term "prudent avoidance" both in its internal policies on EMF and in its proposed statewide EMF policy, even though both its internal policies and the proposed statewide EMF policy follow the principles of "prudent avoidance." As correctly noted by the ALJ, the term "prudent avoidance" is merely a framework for analyzing actions relating to EMFs in light of the scientific uncertainty and not a definable term. I.D. at 198-99.

Further, as shown by the evidence in this case, the term "prudent avoidance" itself is capable of different interpretations, especially by lay persons who tend to interpret the term as meaning "it is prudent to avoid any exposures to EMFs." See, e.g., I.D. at 131. At least one utility commissioner has written that the term "prudent avoidance" itself "borders on being merely clever verbiage

which means different things to different people." Supra, 138 P.U.R. 4th at 204. OCA apparently prefers the terminology "prudent policy in the face of uncertainty." OCA St. No. 2, pp. 7-8.

In any event, notwithstanding concerns about the term "prudent avoidance," PP&L's proposed statewide EMF policy is consistent with principles of "prudent avoidance," as articulated in this proceeding. PECO Reb. St. No. 6, pp. 15-19; I.D. at 198-99. Further, the mandated EMF policy proposed by PP&L is consistent with the recommended prudent policy in the face of uncertainty that is espoused by OCA. OCA St. No. 2, p. 8.

4. Nothing Would Be Served By Further Delaying Energization of the Woodbourne-Heaton Line

Further, given the ALJ's extensive findings regarding the Woodbourne-Heaton Line's compliance with principles of prudent avoidance (See Section III.B.4 above) and the Commission's previous determinations about compliance with the Commission's regulations, no purpose would be served by further delaying energization of this line. There is simply nothing else left for the Commission to do with regard to this line, but to permit its energization, to move forward and to mandate policies which should prevent similar litigation in the future.

PP&L's proposed solution provides a better means of moving forward constructively than does the ALJ's proposal to further delay energization, adopt questionable standards and then reexamine the question of energization. Even if the ALJ's proposal were adopted in full by the Commission, it appears that, based on the ALJ's findings about the line, the line would eventually be energized. Further delay would be counter-productive.

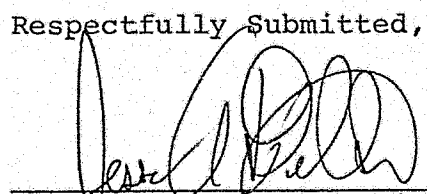
5. PP&L's Proposed Solution Attempts to Eliminate Concerns About a De Facto Moratorium

Finally, PP&L's proposed solution should eliminate concerns about a de facto moratorium over new transmission line siting and construction. If the Commission clearly states that new siting and construction is to continue during any delay in promulgation of a policy statement or regulation, the Commission can prevent increases of magnetic fields on existing facilities and permit electric utilities to continue to meet their statutory obligations to provide reasonably adequate and economic service during the pendency of the EMF policy statement or regulation proceeding.

IV. Conclusion

WHEREFORE, for all of the foregoing reasons, the Pennsylvania Public Utility Commission should not adopt the relief proposed by the ALJ in his Initial Decision, but should instead: 1) permit the Woodbourne-Heaton Line to be energized; 2) institute a proceeding which would mandate that all electric utilities in the Commonwealth adopt a comprehensive EMF Policy as explained above; and 3) state expressly that line siting applications currently pending and received during the pendency of the regulation or policy statement proceeding on EMF will not be delayed pending the outcome of the EMF proceeding, but will be decided on their individual merits in accordance with present procedures.

Respectfully Submitted,



Jesse A. Dillon, Esquire
Pennsylvania Power & Light Company
Two North Ninth Street
Allentown, Pennsylvania 18101
(215) 774-5013

Dated: September 8, 1992
at Allentown, Pennsylvania

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

LETTER OF NOTIFICATION OF PHILADELPHIA ELECTRIC COMPANY RELATIVE TO RECONDUCTORING AND REBUILDING THE EXISTING LINE TO OPERATE AS A WOOD-BOURNE-HEATON 230 KV LINE IN BUCKS AND MONTGOMERY COUNTIES	:	Docket No. A-110500F055

CERTIFICATE OF SERVICE

I hereby certify that I have this date served a true copy of the foregoing on the following in accordance with the requirements of 52 Pa. Code § 1.54:

VIA FEDERAL EXPRESS

The Honorable Herbert S. Smolen
Administrative Law Judge
Pennsylvania Public Utility Commission
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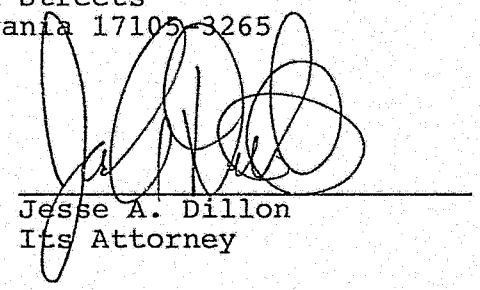
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Jesse A. Dillon
Its Attorney

Dated: September 8, 1992
at Allentown, Pennsylvania

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SECRETARY'S OFFICE
Public Utility Commission

Mr. John Alford
Secretary
Pennsylvania Public Utility Commission
North Office Building
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Harrisburg, PA 17105-3265

Re: Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 KV Line to Operate as a Woodbourne-Heaton 230 KV Line in Montgomery and Bucks Counties; Docket No. A-110550,F.055

Dear Mr. Alford:

Enclosed are an original and nine copies of Philadelphia Electric Company's Exceptions in the Woodbourn-Heaton proceeding which are being filed today (September 8, 1992) by Federal Express pursuant to 52 Pa. Code § 1.11(a)(2). Copies have been served on the ALJ and all parties today.

Respectfully yours,

Ward L. Smith

cc: (via Overnight Mail)
Hon. Herbert S. Smolen
Robert J. Sugarman, Esquire
Tanya J. McCloskey, Esquire
Patricia Krise Burket, Esquire
Jesse A. Dillon, Esquire

MPK

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a true copy of the foregoing document upon the parties and in the manner indicated below in accordance with the requirements of 52 Pa. Code § 1.54.

By Overnight Mail

The Honorable Herbert S. Smolen
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Dated: September 8, 1992

ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Letter of Notification of	:	
Philadelphia Electric Company	:	
Relative to Reconstructing and	:	
Rebuilding of the Existing 138 kV	:	Docket No.
Line to Operate as a Woodbourne-	:	A-110550, F. 055
Heaton 230 kV Line in Montgomery	:	
and Bucks Counties	:	

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SECRETARY'S OFFICE
Public Utility Commission

EXCEPTIONS OF

PHILADELPHIA ELECTRIC COMPANY

To the Initial Decision Of
Administrative Law Judge Herbert Smolen

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September 8, 1992

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ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as a Woodbourne-Heaton 230 kV Line in Montgomery and Bucks Counties	:	Docket No. A-110550, F. 055

EXCEPTIONS OF

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I. INTRODUCTION

This case comes before the Commission so that it can determine whether to reaffirm its February 9, 1990 approval to construct and energize the Philadelphia Electric Company ("PECO") 230 kV Woodbourne-Heaton transmission line. Subsequent to the Commission's February 9 Order, certain local residents ("Protestants") were granted an opportunity to prove that there is a basis for their fear that electric and/or magnetic fields ("EMF") associated with the line will cause adverse human health effects and/or adverse land use impacts sufficient to warrant disapproval of the line. Twelve days of hearings were held over a period of seven months on that question. The testimony of ten experts was taken. Adminstrative Law Judge Smolen ("ALJ") correctly determined that no adverse effects on either health or land use were demonstrated by this expert testimony:

- The line meets all applicable safety standards for its construction, operation, and maintenance (Finding of Fact No. 31, I.D., p. 124).
- The scientific evidence does not support a conclusion that EMF causes adverse human health effects (I.D., pp. 178-79).
- The testimony of Protestants' sole land use expert was fatally flawed (I.D., p. 196). No land use impact of any sort was found to have been demonstrated by Protestants' land use expert.
- The design used for the line will result in the lowest levels of EMF that could be achieved using technologically available designs (Finding of Fact No. 32, I.D., p. 124).
- Having incorporated modest measures to reduce EMF, the design, route, and field levels associated with the line comport with the concept of "prudent avoidance" (I.D., pp. 204-07).
- EMFs associated with the line are in the same range as other 230 kV transmission lines in Pennsylvania and elsewhere in the United States, and meet all existing magnetic field standards (Findings of Fact No. 33, 34, 35 and 55, I.D., pp. 124-25, 129-30).

As described below in Part A of the Argument, these findings prove that this needed transmission line meets the Commission's standards for approval found at 52 Pa. Code § 57.76. It will not cause an unreasonable risk of danger to the safety or health of the public, and it has minimum adverse environmental impact.

Twenty-two Protestants, however, appeared at the hearing and declared that if the Commission does not disapprove this line they will move, stop using their yards, or stay inside because of their fear of EMF. *See* I.D., pp. 196-97. Based solely on this testimony, the ALJ refused to recommend energization of the line, notwithstanding his findings that the line will not cause a danger to safety or health and that EMF from the line has already been minimized. Instead, he concluded that the Commission's existing standards are not adequate to determine whether this line should be energized, and that until the Commission develops and adopts new EMF standards this line should not be energized. I.D., pp. 207-08.

PECO respectfully submits that this is an inappropriate approach to determining whether to approve a transmission line. The Commission is aware of the EMF issue and has been aware of it for years. It clearly has given and continues to give considerable thought to the policy question of whether it should implement EMF standards. It undoubtedly is aware that the question of whether to set EMF standards, and if so in what form, is very complicated. To date, it has not chosen to undertake to formally consider or adopt such standards. It most certainly has not implemented a moratorium on construction of needed transmission lines during its consideration of these questions -- nor should it, for that would be disasterous public policy. But that is precisely what the ALJ has done in this proceeding -- he has devised and applied a *de facto* standard of zero EMF. That is not appropriate. This line should be evaluated -- and approved -- under the Commission's existing standards.

II. EXCEPTIONS

The PECO respectfully notes the following Exceptions to the Initial Decision:

1. The Line Meets The Commission's Standards. Exception is taken to the ALJ's failure to recommend energization of this line, which meets the Commission's standards for approval of a line.

2. Protestants' Declared Self-Imposed Changes In Future Behavior Should Not Be Allowed To Thwart This Needed Transmission Facility. Exception is taken to the suggestion that delay in energizing the line is warranted by Protestants' declared self-imposed changes in their future behavior.

3. The Commission Should Not Delay Needed Projects Pending Its Evaluation Of Whether To Adopt Standards. Exception is taken to the recommendation that the Commission should delay energizing needed projects, including this transmission line, pending the development of EMF standards.

III. ARGUMENT

A. The Line Meets The Commission's Standards

The Woodbourne-Heaton line meets the Commission's standards for approving a transmission line. PECO thus takes strong exception to the ALJ's failure to recommend immediate energization of the line.

The Commission's Regulations state that three relevant findings must be made for approval of a transmission line: (1) the line must be needed, (2) it cannot cause an unreasonable risk of danger to the safety and health of the public, and (3) it must have minimum adverse environmental impact (including land use impacts), considering the electric power needs of the public, the state of available technology and the available alternatives. *See* 52 Pa. Code § 57.76. [1]

There can be no argument that the Woodbourne-Heaton line meets the first of these standards: the Commission's previous Orders clearly establish that this line is needed. *See e.g.* Commission Order of February 9, 1990 (approving Letter of Notification); Commission Order of March 6, 1992 at 14 (". . . the Commission has already found public need for the reconstruction of the Conrail electric line."); Commission Order of May 2, 1992 at 5 (" . . . the Commission found public need . . . when it approved PECO's Letter of Notification."). [2]

---

1 The provision of 52 Pa. Code § 57.76 (a) (3) requiring compliance with applicable natural resource standards was not at issue in these hearings.

2 Protestants have maintained throughout these hearings that need has not yet been determined, since they have not presented evidence on need. *See e.g.* N.T. 102. The argument is, however, ill-conceived. Protestants have now had multiple opportunities to convince the Commission, the Court, and the ALJ to reopen this proceeding to take evidence on need, and have failed in each instance. *See* March 6 Order, Palladino Order at 2, June 14 Order at 2, ALJ Order at 5. Even Commissioners Rhodes and Rolka, in their dissents arguing for a reopened proceeding, did not state that the Protestants should have the opportunity to present testimony on need. The simple fact is that need is not a new and novel issue on which the Commission required additional information on which to base its decision. Protestants should not be heard once again in their claim that need is still at issue.

With regard to safety and health, the Initial Decision clearly establishes that the line will not create an unreasonable risk of danger to the safety or health of the public. Finding of Fact No. 31 addresses the safety issue, and states that: "The Woodbourne - Heaton 230 kV Line has been designed and constructed and will be maintained in accordance with the National Electrical Safety Code." I.D., p. 124. With regard to health, the Initial Decision states that "The scientific evidence does not support a conclusion that EMF causes adverse human health effects." I.D., pp. 178-79. In both cases, it is clear that no "unreasonable risk of danger" has been demonstrated.

With regard to land use and other environmental impacts PECO first notes, as detailed in Section B below, that it would be poor public policy to accept Protestants' declared self-imposed changes in future behavior as a "land use impact" sufficient to warrant disapproval of the line under the Commission's regulations.

Assuming for the sake of argument that the Protestants' fear, and their declared self-imposed changes in behavior do constitute a "land use impact," the record establishes that the line nonetheless meets the Commission's standards because PECO has already minimized those impacts given the public need, the state of available technology and the available alternatives.

First, PECO used the favored "common corridor" approach for this transmission line, reconstructing an existing transmission line on an existing utility right-of-way. The Commission has previously recognized that the common corridor approach minimizes land use impacts:

> "PECO's proposed use of an established, cleared railroad right-of-way eliminates the need to acquire and clear land to establish a new right-of-way and eliminates the cost of land acquisition and clearing from the overall cost of the project. Thus not only are potential adverse environmental impacts eliminated, or significantly minimized, but costs which would contribute to potential rate increases are also minimized."

In Re Philadelphia Electric Company, 67 Pa. PUC 52 (1988) (emphasis added). *See also* Feb. 9 Order at 4. Similarly, the ALJ found that the use of an existing utility

corridor for this line "avoids creation of a new utility corridor," with the land use disruptions attendant to creating a new corridor. *See* Finding of Fact No. 57, I.D., p. 130.

Second, the design of the line minimizes any "land use impact" from Protestants' declared self-imposed changes in future behavior. Protestants say that it is "fear" of EMF that leads to such self-imposed changes in their behavior. *See* I.D., p. 181. The ALJ found that PECO already has done everything technically possible to reduce EMF:

> "The compact delta design used for the Woodbourne-Heaton 230 kV transmission line will result in the lowest levels of 60 Hz electric and magnetic fields that could be achieved on the existing right-of-way using technologically available designs for 230 kV transmission lines."

Finding of Fact No. 32, I.D., p. 124 (emphasis added).

Third, the ALJ found that the line comports with prudent avoidance in its design, use of an existing right-of-way, and levels of EMF. *See* Findings of Fact No. 33, 34, 35 and 55, I.D., pp. 124-25, 129-30, pp. 204-07. According to the ALJ, this is precisely what should be done to minimize fear -- *i.e.*, prudent avoidance is the "current approach" to minimizing fear of EMF. I.D., p. 198.

In sum, that which could reasonably be done to minimize Protestants' fears and declared self-imposed changes in future behavior was done. That is more than sufficient to meet the Commission's regulations on land use impacts, which require only that such impacts be minimized, not eliminated.

Applications for administrative approval must be and can only be judged on the criteria for approval and the record evidence that exist today. This is especially true where, as here, the Commission's existing regulations already provide comprehensive standards that allow a full evaluation of whether the line adversely affects safety, health, land use, or the environment and, if so, whether those adverse effects are sufficient to warrant disapproval of the line. Approval should not be contingent upon some administrative event or criteria that has not and may never come into fruition, and which if enacted would admittedly have no relationship to

health -- but that is precisely what the ALJ has recommended to the Commission. PECO submits that the Commission should instead follow its normal course of action and determine whether Protestants have demonstrated adverse effects sufficient to warrant disapproval of the line. On this record, with the findings of fact made by this ALJ, the answer to that inquiry can only be a clear and resounding "no."

B. Protestants' Declared Self-Imposed Changes In Future Behavior Should Not Be Allowed To Thwart This Needed Transmission Facility

PECO does not dispute that the Commission has authority to consider land use impacts and whether those impacts have been minimized. PECO does, however, take exception to the ALJ's conclusion that Protestants' can effectively thwart this needed project simply by claiming that they have a fear of EMF -- a fear based on one-sided information about EMF from the media and PAUSE, Findings of Fact No. 67 and 68, I.D., p. 132 -- and declaring that they will change their future behavior if the line is energized.

First, the Commission itself has already spoken twice on the question of whether Protestants' fears and concerns, of and by themselves, are sufficient to warrant delay in energizing this line. Protestants' September 4, 1990 motion for a stay and their April 8, 1991 motion for a stay both squarely presented that question to the Commission. In both instances the Protestants stated that they were concerned about EMF and asked the Commission to delay construction pending an evaluation of those concerns. In both cases the Commission found that the Protestants' EMF concerns, standing alone, were insufficient to stay construction of the line. *See* March 6 Order at 12-14, May 8 Order at 4. It is particularly notable that, while the Commission was split on the question of whether Protestants were entitled to this hearing, it was unanimous in its opinion that Protestants' EMF concerns were not a basis for delay. *See* March 6 Order at 12-14; Commissioner Rolka's dissent at 1 ("I do not believe that Petitioners have met the standard for a stay."); Commissioner Rhodes' dissent at 4 (I believe that . . . petitioners have not now met the requirements for a stay.")

That was good policy and good law. PECO submits that if Protestants' concerns did not justify a delay pending an examination of their EMF claims, those concerns cannot possibly justify a delay of the line now that Protestants have had a full hearing and failed to prove that their EMF concerns are based in fact.

Second, if the Commission were to accept Protestants' concerns as a basis for delay, an extremely dangerous precedent would be set. To PECO's knowledge, the Commission has never before ordered that a needed transmission project be delayed or otherwise halted on the grounds that a few residents have declared that they are fearful and would change their own future behavior if the Commission approved a utility project.

It is widely recognized that the construction and operation of major economic infrastructure projects may upset some individuals near whom such construction and operation will occur. The entire regulatory scheme of the Commission is designed to allow needed public projects to proceed in the face of such claims and opposition unless it can be proven that the project fails to meet the Commission's established criteria for evaluating such projects. It is unfortunate that construction of such projects will upset those nearby, but it cannot always be avoided and should not be permitted to thwart a utility project that is needed to serve the public good. Moreover, Protestants' declared self-imposed changes in behavior go beyond what should be considered "prudent" for an individual. The concept of prudent avoidance suggests only modest efforts to reduce field exposure, such as changing the location of alarm clocks and television sets or the manner in which appliances are used. Findings of Fact No. 49, 70, I.D., pp. 128, 132-33.

Any other interpretation would literally stand the Pennsylvania Public Utility Code on its head and sacrifice the public interest at the expense of the private interests of a few. If the ALJ's recommendation is adopted, any property owners could thwart a public utility project simply by stating, as Protestants have done in this proceeding, that they are fearful and will change their future behavior if the line is energized. If that is the standard that must be met, no future transmission line will ever be placed into operation.

Third, even assuming that fear is a factor to be considered in determining whether to approve a transmission line, the ALJ created an unworkable definition of "reasonable fear." The ALJ apparently put great weight on his view that

Protestants' fears and declared self-imposed changes in future behavior are "reasonable . . . due to the current uncertainty of the scientific research." I.D., p. 197. The view that uncertainty makes the fears "reasonable" is misguided and based on a misunderstanding of the nature of scientific proof. It is impossible to prove a scientific negative; thus, except for those situations in which it is clearly proven that a physical or chemical agent is harmful, there will always be scientific uncertainty. The ALJ's reasoning thus leads to the unfortunate but inescapable conclusion that essentially all fears are reasonable. An intervenor in a utility project approval process could thus stop literally any project merely by proving that some scientific questions are unresolved. One could not derive a more accurate prescription for a total statewide policy of absolute no-growth. Such a policy is not only unwarranted, it would be disasterous.

Fourth, Protestants' fears are not reasonable. Under a valid definition of reasonableness, Protestants' fears and concerns would and should be found to be unreasonable. For example, in *Zappavigna v. State of New York*, Claim No. 74085 (N.Y. Ct. Cl. 1989), the New York Court of Claims evaluated whether fear of EMF is a "reasonable fear." In that case, the Judge found that there is scientific uncertainty -- *e.g.*, some scientists are "concerned that potential problems they have identified need further scientific examination." *Zappavigna* at 25. Yet the *Zappavigna* court found that such a finding did not establish that there is a reasonable basis for fear: "[T]he court finds that claimant failed to sustain his burden of preponderating in the evidence on the issue that there is a reasonable basis for any fear that power lines cause health problems." *Id.* at 25.

In sum, there are very real dangers to the public interest inherent in the ALJ's suggestion that Protestants' declared self-imposed changes in future behavior warrant delay in energizing the line. If "reasonable fear" -- meaning fear based on uncertainty -- and self-imposed changes in behavior are sufficient to warrant disapproval of a transmission line, then the public interest can be held hostage to any intervenor with an imagination and an allegation of concern.

C. The Commission Should Not Delay Needed Projects Pending Its Determination Of Whether To Adopt Standards

The Initial Decision essentially recommends implementation of a *de facto* moratorium on construction of transmission lines -- or for that matter, of any utility facility with which EMF is associated -- until such time, if any, as the Commission implements EMF standards. PECO takes exception to this recommendation, both as applied to this specific project and as a matter of statewide policy.

As to this project, the Initial Decision is incorrect in stating that a delay in energizing the line would not unduly prejudice PECO or its customers. *See* I.D., p. 208. The Commission has already found that PECO and its customers will be substantially prejudiced by delay in this needed project:

> " . . . the Commission found public need for the reconstruction of the old Conrail electric line as the Woodbourne-Heaton 230 kV line when it approved PECO's Letter of Notification. It is, therefore, inconceivable that halting construction of this line even temporarily would not adversely affect PECO or the public interest."

May 2 Order at 5 (emphasis added).

As a statewide question, PECO strongly urges that a moratorium would be very much against the public interest. The State of Wisconsin recently completed a lengthy proceeding in which the question of whether to impose a moratorium was directly addressed. Its conclusions are quite instructive -- the proposal of a moratorium pending develop of standards was soundly rejected:

> " The Commission finds that a moratorium on building new or rebuilding existing transmission lines . . . is not a reasonable response to this risk. Not only are transmission lines a small source of overall exposure to EMF, but a moratorium is likely to increase levels of exposure, not reduce them. Since utilities would remain obliged to provide adequate and reliable power to Wisconsin residents, a prohibition on new or rebuilt transmission lines may cause utilities to increase the current flow on existing lines. This would increase magnetic fields in existing corridors. . . . Imposing a moratorium would not be in the public interest."

Wisconsin Public Service Commission Order No. 05-EP-6, May 5, 1992, pp. 6-7 (emphasis added).

Moreover, the development of EMF standards, if it is to occur, would be a complex and time-consuming undertaking. In his dissenting opinion to the Commission's March 6 Order, Commissioner Rhodes identified some of the factors involved in standard-setting that make it so complex and time-consuming, *e.g.*, an examination of the implications of standards for the entire Commonwealth is needed, as well as input from agencies such as the Department of Health and the Department of Environmental Resources. Rhodes' dissent at 4. PECO submits that there are numerous additional aspects of and questions related to standard-setting that the Commission would need to address, including:

(1) Can any material reduction in fear be expected to result from standard setting?

The record in this proceeding provides some guidance on how difficult it would be to fashion an EMF standard to address public concern. In the Initial Decision, the ALJ stated that delaying energization of the Woodbourne-Heaton line until EMF standards are adopted would have "multiple benefits," *e.g.*, decreasing the Protestants' fear of EMF. I.D., p. 208. The record in this proceeding, however, is totally bereft of any evidence to support the conclusion that the adoption of and compliance with field standards would alleviate fear of potential health effects. To the contrary, the record evidence indicates that no such result should be expected. For example, the record shows that:

- Protestant Robert Small testified that statements of prudent avoidance increased, rather than decreased, his fears: "Prudent avoidance is a cop out. It is not helping the layman understand what to do. They are instilling fear, they are legitimizing fear . . ." (N.T. 277) (emphasis added).

- It has been Protestants' claim throughout this proceeding that advocacy of prudent avoidance is an admission of health risk. *See e.g.* Protestants' Main Brief, pp 4-5. While the ALJ found this to be untrue as a matter of science fact

and policy, I.D., p. 204, if Protestants think it is true, a formal standard can only increase their fears.

• It is unclear whether any PUC statement could reduce these Protestants' fears. For example, Mr. Edward Koerper testified that he was not reassured when he read a California PUC report of which he first became aware from a public statement by Commissioner Smith -- a report which concludes that no regulatory activity is warranted at this time. N.T. 112, *see* Report to the California State Legislature by the California Public Utilities Commission, Potential Health Effects of Electric and Magnetic Fields From Electric Power Facilities, Sept. 15, 1989 at B-4.

• The ALJ found that Protestants' fears are based on scientific uncertainty. Finding of Fact No. 69, I.D., p. 132. Yet standards can do nothing to change the state of science, and there is thus no reason to believe that standards would reduce Protestants' fears.

• The ALJ himself has now told Protestants that this line comports with prudent avoidance, has minimum EMF levels, meets all existing EMF field standards, and that there is nothing unusual about the fields from this line. If that is not sufficient to assuage Protestants' fears, there is no basis on this record to believe that their fears would be alleviated by standards.

(2) Should formal standards of any sort be adopted?

The Commission also may wish to consider the possibility that standards are not an appropriate response to the EMF issue. Several states have taken this approach, *e.g.*:

The California PUC, in a 1989 Report to the California legislature, concluded that: "It is recommended that California take no action at the present to regulate electric and magnetic fields around electric power facilities. Any such actions are premature given current scientific understanding of this public health issue. Too little is known presently to be able to determine where or what rules would provide useful protection. . . . [I]t is premature to regulate power-line fields . . . " Report to the California State Legislature by the California Public Utilities Commission, Potential Health Effects of Electric and Magnetic Fields From Electric Power

Facilities, Sept. 15, 1989 at B-4. (emphasis added). The California PUC has since instigated a new proceeding to determine whether it will adopt standards.

In 1989, Maryland reviewed EMF issue in the Brighton-High Ridge proceeding. The Hearing Examiner declined to do set standards, finding it "inappropriate to set standards for magnetic fields or rights-of-way which have no scientific basis." The Commission adopted the Hearing Examiner's Recommended Decision. *See* Md. PSC Case No. 7004, Proposed Order of Hearing Examiner, December 21, 1989, p. 80, and Order No. 68784, May 1, 1990 (emphasis added).

In 1992, the Public Utility Commission of Texas issued the report of its "Blue Ribbon Panel" of scientists which recommended that "neither the PUC nor other state authorities [should] attempt to set EMF standards." With regard to a prudent avoidance based standard, the Panel recommended that "the PUC [should] continue its policy of de facto "prudent avoidance" in the siting of transmission lines" without formalizing that policy as regulations. *See* Report of the Electro-Magnetic Fields Health Committee to the the Public Utility Commission of Texas, March, 1992, p. xxi.

Of course, the Commission is aware of the conclusions of the Pennsylvania House Conservation Committee on this issue: "At this point, it is the sense of the Conservation Committee that any action beyond research is premature." Report of the House Conservation Committee Study of the Electro Magnetic Fields Pursuant to House Resolution 38, Nov. 30, 1990, p. 15.

(The fact that a "no-standard" option must be considered as a serious possibility is a strong reason not to delay energizing the Woodbourne-Heaton line "pending" adoption of such standards.)

(3) If formal standards are to be adopted, is it appropriate to implement limits on EMF levels as part of those standards?

The Commission may well determine that edge of right-of-way limits on EMF levels are not an appropriate regulatory response. PECO is aware of only two states that have adopted magnetic field standards: New York and Florida. Other states, such as Colorado, have recently withdrawn from consideration their proposed edge of right-of-way magnetic field level standard on the grounds that it "may give the mistaken appearance of precision in this area -- precision which we find may not be justified by the state of scientific research today." *See* Colorado Public Utilities Commission Decisions No. C89-1622 (December 20, 1989), No. C92-600 (April 29, 1992), and C92-999 (July 31, 1992).

(The Woodbourne-Heaton line meets all existing field standards. Thus, no purpose would be served by delaying energization while the Commission determines whether such standards should be formally adopted in Pennsylvania.)

(4) <u>If edge of right-of-way limits on EMF are to be adopted as part of a regulatory standard, what will be the basis for such limits</u>?

The Commission will need to carefully consider the basis for any field level standard it might adopt. The New York and Florida magnetic field standards are not health or science based. *See* Statement of Interim Policy on Magnetic Fields of Major Electric Transmission Facilities, State of New York Public Service Commission, September 11, 1990; Florida Administrative Code § 17-274. The Florida Department of Environmental Regulation, which issued the Florida regulations in January 1989, found itself embroiled in a lawsuit within the year that challenged those standards as arbitrary. *See* Hillsbourough County, Florida v. Florida Department of Environmental Regulation, DOAH Case No. 90-0001R.

(If the Commission were to adopt a field limit standard based on "similarity" to existing transmission lines in Pennsylvania, the ALJ has already found that the Woodbourne-Heaton line would meet those standards. Finding of Fact No. 35, I.D., p. 125. There would be no purpose to delay energization pending such standards.)

(5) If prudent avoidance is to be incorporated into a formal standard, what aspects of the concept would be incorporated, and in what manner?

If the Commission opts for a prudent avoidance type standard, it may find unexpected complexities in implementing the details of such a standard. The record evidence in this case indicates that "prudent avoidance is a general framework that has not been codified." I.D., p. 199. The ALJ himself listed a broad array of factors to be considered in evaluating a prudent avoidance policy. I.D., pp. 208-09. The determination of which of these factors should be incorporated, and how, would be a complex issue for the Commission.

(The ALJ has already found that all aspects of the Woodbourne-Heaton line, including design, route, and field levels, comport with prudent avoidance. *See* I.D., pp. 204-07. Thus, regardless of which aspect or aspects of prudent avoidance the Commission might eventually adopt, there would be no advantage to delaying this line pending such standards. The ALJ has already found that the line would meet any standards based on the concept of prudent avoidance.)

(6) What length of time should the Commission set aside for its standards proceeding?

New York conducted over two years of investigations, including a major research study of existing field levels, before setting its standards. *See* Statement of Interim Policy on Magnetic Fields of Major Electric Transmission Facilities, State of New York Public Service Commission, September 11, 1990. Florida took nearly six years, including two major science investigations, to set its standards. Colorado began its investigation in 1989 and is still involved in that process. *See* Colorado Public Utilities Commission Decisions No. C89-1622 (December 20, 1989), No. C92-600 (April 29, 1992), and C92-999 (July 31, 1992). California began its proceeding in 1988 and has not set standards. *See* Report to the California State Legislature by the

California Public Utilities Commission, Potential Health Effects of Electric and Magnetic Fields From Electric Power Facilities, Sept. 15, 1989.

(The Commission undoubtedly would want to allow sufficient time for a detailed review by all interested parties of the EMF issue before determining whether to set standards. Such a review, which clearly is an extended process, argues strongly against delaying the Woodbourne-Heaton line -- and thus harming the public interest -- pending such a consideration.)

(7) How can a standard be fashioned so that it allows change in light of new scientific findings?

The ALJ's Initial Decision states that EMF research is needed and ongoing. Finding of Fact No. 74, I.D., p. 133. The Commission would need to carefully consider how a standard could be fashioned that would be responsive to those research results as they are released. Otherwise, the Commission would risk "freezing" its EMF policy at a time when the ALJ concludes that there is scientific uncertainty.

(If any Commission standard will be fashioned so that it is responsive to changes in science, then there is no reason to delay energizing the Woodbourne-Heaton line now. Such an approach would be a *de facto* recognition that needed lines should proceed in the face of scientific uncertainty.)

(8) If a standard is to be set, will it apply only to new facilities or will it also apply to existing facilities?

The Commission will need to determine whether any standard will include a "grandfathering" clause for existing facilities. Obviously, the policy implications for applying standards to existing facilities are significantly different than for a standard applying only to new facilities.

(The Woodbourne-Heaton line is already fully constructed. A reasonable "grandfather" clause likely would not require fully constructed projects to meet the new standard. There would thus be no advantage to delaying energization of the line pending consideration of standards that likely would not be applied to the line in any event.)

In sum, PECO submits that it is unwarranted for the ALJ or anyone else to assume today that the Commission will adopt EMF standards. It is clear, however, that if the Commission pursues that course, a quick resolution almost certainly will not be forthcoming. Delaying energization of needed transmission lines (such as the Woodbourne-Heaton line) pending development of such standards would be seen for what it would be -- an economic no-growth policy until further notice.

This is not to say that the Protestants' fears of EMF should be "summarily ignored or dismissed." I.D., p. 207. Nor, in PECO's view, has the Commission done so. The Commission has held full hearings on those concerns. The Commission may well wish to take the ALJ's recommendation of a standard-setting proceeding under consideration *in extenso*. As to this line, however, the Commission, having given Protestants' the hearing they wanted, and having evaluated the record evidence, should recognize that this line meets the Commission's existing standards and thus grant approval for immediate energization in the public interest.

IV. CONCLUSION

For the foregoing reasons, the Commission should grant the Company's Exceptions, adopt the portions of the Recommended Decision finding no adverse effects, reject the portions of the Recommended Decision which suggest that energization of this line should be delayed, and reaffirm its prior approval of this line.

Respectfully submitted,

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September 8, 1992

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September 8, 1992

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SECRETARY'S BUREAU

John G. Alford, Secretary
Pa. Public Utility Commission
Post Office Box 3265
Harrisburg, PA 17105-3265

Re: Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as the Woodburne-Heaton 230 kV Line in Montgomery and Bucks Counties.

Docket No. A-110550F055

RLS

Dear Secretary Alford:

Enclosed please find an original and nine (9) copies of the Office of Trial Staff's **Exceptions** for filing in the above-captioned proceeding.

Very truly yours,

Charles F. Hoffman, Esquire
Chief Prosecutor
Office of Trial Staff

Enclosure

CFH:em

cc: Parties of Record
Office of Special Assistants

ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DOCKETED
SEP 16 1992

Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138kV Line to Operate as the Woodbourne - Heaton 230 kV Line in Montgomery and Bucks County	:	Docket No. A-110550F055

DOCUMENT FOLDER

RECEIVED
SEP 8 1992
SECRETARY'S OFFICE
Public Utility Commission

EXCEPTIONS OF THE
OFFICE OF TRIAL STAFF

AND NOW, this 8th day of September, 1992, the Office of Trial Staff (OTS) of the Pennsylvania Public Utility Commission (Commission) files the following Exceptions, pursuant to 66 Pa. C.S. §332(h).

I. INTRODUCTION

On August 19, 1992, Administrative Law Judge (ALJ) Smolen issued an Initial Decision in the above-captioned matter concerning a notice to the Commission by Philadelphia Electric Company (PECO) relating to the reconstruction and reconductoring of an existing 138 kV line to operate as a 230 kV line (Woodbourne - Heaton 230 kV line). The Initial Decision, which was in response to a Remand Order of the Commonwealth Court, considered evidence as to electromagnetic

field ("EMF") health effects and land use impacts in determining whether or not the Woodbourne - Heaton line should be energized. OTS ordinarily does not file exceptions to ALJ Decisions in cases where OTS has not participated as a party. In this case OTS is compelled to file exceptions to those limited areas of the Initial Decision wherein it is perceived that an acceptance by the Commission of certain findings and statements could be interpreted as a "prejudging" by the Commission of certain issues in controversy in the pending GPU/DLC proceeding.

In addition, OTS also must except to the ALJ's conclusion that the Commission does not possess the requisite authority to permit the consideration of alleged damages to private property in an assessment of the adverse impact to property owners. See R.D., p. 194. Such a conclusion apparently results from a footnote in a Commission Order entered in this matter on March 8, 1991. Further discussion concerning these Exceptions is found below.

II. THE FINDINGS AND CONCLUSIONS IN THIS PROCEEDING CONCERNING EMF HEALTH EFFECTS MUST BE STRICTLY LIMITED TO THE EVIDENCE ADDUCED IN THIS CASE.

OTS excepts to Findings of Fact #36, #37, #38, #39, #40, #41, #42, and #43 found on pages 125-127 of the Initial Decision and to Ordering Paragraph #2 on page 211 of the Initial Decision to the extent that these findings and conclusions do not specifically contain language by which the

statements and conclusions are limited to the evidence of record in the Woodbourne - Heaton case. At page 11 of the Initial Decision, ALJ Smolen stated clearly and concisely his responsibilities in this case:

> Thus, the Administrative Law Judge must determine whether the record evidence presented by the parties is sufficient to support a finding that Petitioners will be adversely affected by the reconductoring of the line at issue. It is not, repeat, not to scientifically determine, one way or the other, for all time, whether EMFs cause or contribute to adverse human health effects. It is, however, as aforesaid, to determine within the framework of the record adduced in this particular case, whether or not there is sufficient record evidence to support a finding that Petitioners will be adversely affected by the reconductoring of the line at issue. [Emphasis in original]

A review of Findings of Fact #36-43 shows no such limitation of those findings to the facts adduced in the record. Rather, these findings of fact are stated broadly as though they would not be subject to challenge even if other evidence were presented. For example, Finding of Fact number 37 states:

> 37. Although biological effects are observed to be associated with EMF exposure, no connection between EMF exposure and human cancer has been conclusively demonstrated (N.T. 368; OCA Statement No. 1 [Janes] at 10.)

It may well be that the Petitioners have failed to carry the burden of proof imposed upon them by the ALJ in this proceeding by failing to prove that EMF causes cancer or other

adverse health effects. That does not mean that the ALJ may find as a fact that no connection between EMF and cancer has ever been conclusively demonstrated.

The granting of this exception will insure that the findings based solely on the evidence presented in this case are properly limited to this case, and no party can pre-empt the full airing of these issues in other cases by arguing that the Commission has already ruled on these issues. For example, parties to the GPU/DLC proceeding, including OTS, will present evidence in that proceeding concerning EMF health effects which would not necessarily be in accord with the findings and conclusions contained in the instant Initial Decision. A Commission decision which incorporates these Findings of Fact in general could certainly damage the impact of such testimony submitted in the pending GPU/DLC proceeding. This prejudicial effect must be avoided if at all possible.

III. THE COMMISSION HAS THE REQUISITE AUTHORITY TO CONSIDER THE POTENTIAL FOR PROPERTY DEVALUATION AND TO CONSIDER THESE ADVERSE IMPACTS WHEN ASSESSING WHETHER THE PUBLIC INTEREST WILL BE SERVED BY LOCATING AND CONSTRUCTING AN HV LINE.

OTS excepts to the ALJ's conclusion, at page 194 of the Initial Decision, that the Commission does not possess the requisite authority to consider alleged damages to private property in deciding whether to permit the construction, location, reconstruction, or rebuilding of an HV transmission line. OTS also excepts to the statement, on page 196, that it

is appropriate to consider, in the context of the within proceeding, the asserted land use impacts, excluding property value decreases. In addition, OTS excepts to the ALJ's interpretation of the Commission's March 8, 1991 Order to the extent that it precludes consideration of property value issues in transmission line proceedings.

OTS readily acknowledges that the Commission cannot award property damages to the Petitioners. However, simply because the Commission cannot award damages for the taking of a property interest, it does not follow that the Commission cannot consider these matters in its determination of whether a proposed HV line is in the public interest or whether it adversely impacts a property owner. ALJ Meehan clearly recognized this distinction in his Prehearing Order #3, dated July 15, 1992, in the GPU/DLC transmission line proceeding. In that Order, ALJ Meehan stated as follows:

> As I stated during the several prehearing conferences, the Public Utility Commission has no power or authority to order the Applicants to pay damages. That is, if John Doe testifies that the construction of the proposed HV line will cause the value of his property to decrease by $10,000, the Commission cannot order any or all of the Applicants [GPU/DLC] to pay any money to John Doe. Only the several courts of common pleas have the authority and power to order the payment of damages. However, as I also stated at those conferences, the occurrence of damages for the taking of property or the extent of property devaluation, etc., are relevant to the overall determination of whether the approval of

> the application for the proposed HV line will be in the public interest.

Prehearing Order #3, Docket No. A-110300F051, July 15, 1992.

As pointed out to Judge Meehan in that proceeding, the Commission has also recognized this distinction in Re West Penn Power Company, 68 Pa. P.U.C. 262 (1988), when it stated:

> [1] With regard to the quantum of harm which the Galiachatos' will suffer, the Court in Kearns v. Pennsylvania Public Utility Commission, 201 Pa. Super. Ct. 174, 49 PUR3d 198, 191 A.2d 700 (1963), said:
>
> > Whether appellants own two other tracts, whether these tracts constitute a single farm, and the effect thereon by the exercise of the power of eminent domain, are questions relating to damages, and must be determined in another forum. Cf. Morris v. Commonwealth, 367 Pa. 410, 80 A.2d 762.
>
> Id at 703. Thus, to the extent that the Exceptions are concerned with the damages which the Galiachatos'; will suffer, it must be recognized that the quantum of damages is not a matter which is within our jurisdiction. That is not to say, however, that the damage which will be suffered by property owners is not a consideration when we address the matter of a siting application. Although not specifically itemized, in conjunction with our consideration of land use and availability of alternative routes, we consider the impact upon land owners; both by reason of the damage and the inconvenience which they will suffer. These considerations were addressed and resolved by means of the Initial Decision of ALJ Banzhoff, which became final on February 26, 1987. (Emphasis supplied).

In conclusion, the Commission clearly possesses the requisite authority, as necessary and proper to carry out its duty to regulate in the public interest, to consider the impact of property value diminution in assessing HV transmission line impacts. Any assertions to the contrary are in error.

IV. REQUESTED RELIEF

WHEREFORE, for all the foregoing reasons, the Office of Trial Staff of the Pennsylvania Public Utility Commission respectfully requests that its Exceptions be granted and that the Initial Decision be modified in accordance with these Exceptions.

Respectfully submitted,

Charles F. Hoffman
Chief Prosecutor
Office of Trial Staff

Pa. P.U.C.
P.O. Box 3265
Harrisburg, PA 17105-3265
(717) 787-4886

Dated: September 8, 1992

CERTIFICATE OF SERVICE

I hereby certify that I am serving the forgoing document, either personally or by first class mail, upon the participants listed below.

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Chief Prosecutor
Office of Trial Staff

Dated: September 8, 1992

A-110550F055

COMMONWEALTH OF PENNSYLVANIA

MPK ORIGINAL
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SEP 03 1992

OFFICE OF CONSUMER ADVOCATE
1425 Strawberry Square
Harrisburg, Pennsylvania 17120

IRWIN A. POPOWSKY
Consumer Advocate

(717) 783-5048

September 4, 1992

John G. Alford, Secretary
PA Public Utility Commission
Room G-23, North Office Bldg.
Harrisburg, PA 17120

DOCUMENT FOLDER

Re: Letter of Notification of
Philadelphia Electric Company
Re: Proposed 230 KV Woodbourne to
Heaton Transmission Line
Docket No. A-110550, F. 055

Dear Secretary Alford:

Enclosed please find for filing an original and nine (9) copies of the Office of Consumer Advocate's Exceptions in the above-captioned proceeding.

Copies have been served upon all parties of record as shown on the attached Certificate of Service.

Sincerely,

Tanya J. McCloskey

Tanya J. McCloskey
Assistant Consumer Advocate

Enclosures
cc: All parties of record

3827MISC

CERTIFICATE OF SERVICE

Re: Letter of Notification of Philadelphia Electric Company Re: Proposed 230 KV Woodbourne to Heaton Transmission Line Docket No. A-110550, F. 055

I hereby certify that I have this day served a true copy of the foregoing document, Office of Consumer Advocate's Exceptions, upon parties of record in this proceeding in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant), in the manner and upon the persons listed below:

Dated this 4th day of September, 1992.

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3828MISC

MPK JR

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DOC FOLDER

LETTER OF NOTIFICATION OF PHILADELPHIA ELECTRIC COMPANY RE: PROPOSED 230 KV WOODBOURNE TO HEATON TRANSMISSION LINE	:	Docket No. A-110550, F. 055

OFFICE OF CONSUMER ADVOCATE'S
EXCEPTIONS

DOCKETED
SEP 16 1992

Tanya J. McCloskey
Assistant Consumer Advocate

Dianne E. Dusman
Assistant Consumer Advocate

For:
Irwin A. Popowsky
Consumer Advocate

Office of Attorney General
Office of Consumer Advocate
1425 Strawberry Square
Harrisburg, PA 17120
(717) 783-5048

DATED: September 4, 1992

I. INTRODUCTION

The Office of Consumer Advocate (OCA) hereby files these Exceptions, in accordance with 52 Pa. Code § 5.533, to portions of the Recommended Decision of Administrative Law Judge Herbert Smolen (ALJ). Preliminarily, the OCA would commend ALJ Smolen for his thorough and carefully reasoned discussion and decision on the many complex issues this difficult case presents.

Prior to setting forth its few Exceptions, however, the OCA would urge the Commission to take action relating to the procedural deficiencies in its regulations which initially permitted the use of the Letter of Notification procedure in this case. Although ALJ Smolen agreed with the OCA that the Commission should consider modification of these regulations, he correctly recognized that it is not within his authority to order changes in the Commission's regulations. Initial Decision (I.D.) at 192-194. It is unusual to have both a Commonwealth Court order and a proceeding which, respectively, speak to the propriety of a Commission regulation and bear witness to the problems, difficulties and expense which can ensue when adequate and timely notice is not provided in advance of Commission action impacting upon the rights of individuals.

As noted by the Commonwealth Court, the Letter of Notification procedure "did not contemplate the fact matrix before this court in which an existing right of way, previously used for rail service, is put to a new use." The Court further stated that the "notice to entities owning property within the proposed right-

of-way provided in 52 Pa. Code § 57.72(d) is insufficient, where, as here, it is clear that Petitioners, as neighboring property owners, will be affected by the new use of the right of way." The OCA submits that the regulations thus set forth procedures which do not protect the due process rights of adjoining landowners, and will inevitably continue to result in deficient orders, subject to appeal.

In the same vein, the OCA submits that the Order entered approving the Letter Notification pursuant to the deficient regulation remains challengeable, and should likewise be reconsidered in light of the record herein. Beyond doubt, a review of the record herein reveals that the actions by PECO constituted a "substantial alteration" of this right-of-way--a situation in which the Letter Notification procedure should not have been invoked.[1] Explicitly recognizing this fact will serve both to enhance the public's confidence in the adjudicative process and to inform all electric utilities that this Commission will be skeptical of any unreasonably broad interpretation of the phrase "substantial alteration."[2]

---

[1] The record in this case would support a conclusion that the right-of-way has been "substantially altered." See OCA M.B., App. C at 1; App. B at 1-2. The Conrail electric line has been de-energized since 1986 (Tr. 10), meaning that it has no voltage and creates no electric or magnetic field. As PECO's witnesses testified, however, the new line would be a 230kV line in continuous operation, except for scheduled maintenance or forced outages. Tr. 48. The field at the edge of the right-of-way will range from 25 to 70 milligauss. PECO St. 2 at 8-9.

[2] Indeed, the Commission has recently indicated its reluctance to make findings solely on the basis of the utility's statements in its filing, where a Protestant disputes the assertion that the

The OCA submits that this case, both substantively and procedurally, demonstrates the important public policy issues that transmission line siting applications present to the Commission. Sound public policy requires an administrative agency to treat this issue in a manner that maximizes this Commission's ability to respond to public concerns on all relevant issues prior to issuance of final orders on such matters. The ALJ has recognized the importance of the principle of responsiveness to public concern in advance of agency action through his recommendation that the Commission implement EMF standards, incorporating principles of prudent avoidance. I.D. at 211-212.

For all of the above reasons, the OCA submits that the Commission should initiate a rulemaking to amend its letter notification regulations in order to prevent a recurrence of the type of due process violation that occurred here. The OCA also supports the ALJ's recommendation that the Commission establish EMF standards and urges the Commission to act expeditiously in this regard.

---

alteration of the use of the right of way is not substantial. See Motion of Chairman David W. Rolka of August 20, 1992 (approved 3-0), Re: Letter of Notification of Pennsylvania Power & Light, Docket No. A-110500F.0157, attached hereto as Appendix A.

II. SPECIFIC EXCEPTIONS

A. The OCA Excepts To The ALJ's Decision Not To Consider The Alleged Decreases In Market Value Of The Protestants' Properties.

At pages 194-195 of the Initial Decision, the ALJ discusses the issue of the consideration of the decrease in property values and disinvestment resulting from the presence and energization of the line. The ALJ recognized that the Commission's March 8, 1991 remand Order stated that issues of "inverse condemnation" and property depreciation are outside the scope of Commission jurisdiction. He recognized further that the issues of "land use" impacts set forth in 52 Pa. Code § 57.72(c)(7) do not operate to expand the Commission's jurisdictional authority to assess damages. The ALJ concluded as follows:

> Accordingly, for all the foregoing reasons, determination of damages due to alleged decreases in market value is not within the Commission's jurisdiction to hear and determine.

I.D. at 195 (emphasis added). To the extent that this conclusion confuses a jurisdictional issue and an evidentiary issue, the OCA respectfully submits that it is in error. That is, while the Commission lacks jurisdiction to award damages for lost property value in a transmission siting case, it is appropriate and may indeed be necessary for the Commission to hear and consider evidence of such losses in deciding the merits of a siting application.

The OCA has agreed throughout this proceeding that the Commission may not assess and determine issues of damages. It must

be recognized, however, that although the issue of whether a utility is liable for compensation due to decreased value is not within the Commission's jurisdiction, evidence material to that legal issue may very well also be material to the issues which must be decided by the Commission in a transmission line siting application. Such evidence therefore should not be excluded from an evidentiary record and should not be "factored out" of the Commission's ultimate determination on transmission line siting applications.

The OCA submits that the Commission has power to receive and consider evidence on both land use and impacts on value in general, and that it should do so. It is not in the public interest for the Commission to don evidentiary "blinders," due only to unnecessary deference to a recognized jurisdictional limitation. To the extent that the ALJ in this case has done so in determining whether these adjacent landowners are "adversely affected", he was in error. The Commission should recognize this in its final order.

Expressed another way, the fact that the Commission cannot order a public utility to write a check for a certain amount because of a "taking" does not necessarily lead to the inference that the Commission cannot even consider evidence as to the effects upon the value of adjacent property. See OCA Reply Brief at 6-8. This issue was recently addressed by ALJ Meehan in the ongoing GPU-DQE transmission line proceeding. Although the proposed GPU-DQE transmission line presents a much different situation, in that all

issues set forth in 52 Pa. Code §§ 57.71 et seq. are being heard, ALJ Meehan correctly recognized:

> As I stated during several prehearing conferences, the Public Utility Commission has no power or authority to order the Applicants to pay damages. That is, if John Doe testifies that the construction of the proposed HV line will cause the value of his property to decrease by $10,000, the Commission cannot order any or all of the Applicants to pay any money to John Doe. Only the several courts of common pleas have the authority and power to order the payment of damages. However, as I also stated at those conferences, the occurrence of damages for the taking of property or the extent of property devaluation, etc., are relevant to the overall determination of whether the approval of the application for the proposed HV line will be in the public interest.

Joint Application of Metropolitan Edison Company, Pennsylvania Electric Company, Jersey Central Power & Light Company, and Duquesne Light Company, Docket No. A-110300, F.051, Prehearing Order #3 at 25 (July 15, 1992) (Emphasis added.).

For the reasons set forth above, and for the reasons set forth in the OCA's Main Brief at 48-55, and the OCA Reply Brief at 6-8 and 20-24, the OCA urges the Commission to overturn ALJ Smolen's Initial Decision at page 195, to the extent it is inconsistent witht the principle set forth above. The Commission should clarify that it will consider evidence of the effect of a transmission line upon the value of neighboring properties relevant to Commission decisions on transmission line siting applications.

B. The OCA Excepts To Two Findings Of Fact Recommended By The ALJ.

1. Prudent Avoidance.

At page 128, the ALJ makes Finding of Fact No. 49 concerning the concept of prudent avoidance based upon the testimony of PECO witness Silva. In the finding of fact, the ALJ states:

> The concept of prudent avoidance suggests modest efforts to reduce field exposure. Prudent avoidance is a concept that recognizes that a scientific determination cannot be made that changes in EMF levels will have any effect on health, and thus prudent avoidance advocates only a modest effort in making such changes (PECO Rebuttal Statement No. 6 [Silva] at 15-16, 18).

R.D. at 128. The OCA would note that PECO witness Silva also stated: "The question of what is "modest" will vary depending upon the specific project." PECO Rebuttal St. No. 6 at 18. The OCA submits that it is also critical to note in the finding of fact that the determination of "modest" will vary depending upon the specific project. The OCA believes this is important in light of the testimony of OCA witness Rosenbaum where he stated:

> In planning one should err on the side of safety, but not without considering the cost. Of course, people can differ as to what cost is reasonable in a given situation. Given the confusing and sometimes conflicting results of studies of low-level, power frequency fields, it is not even entirely clear what erring on the side of safety means. Nevertheless, I believe that it is prudent to take measures to lower the public's exposure to magnetic fields if this is not too costly. "Too costly" is

> one of the things that needs to be worked out in public consultations with all affected parties.

OCA St. 2 at 8.

The OCA submits that it is critical for the Commission to recognize at this juncture that the determination of "modest" will be an on-going effort--with public input into the process--that may vary depending upon the circumstances of a particular case. As such, the OCA requests that the Commission add language from PECO's testimony to Finding of Fact No. 49, so that it reads as follows:

> The concept of prudent avoidance suggests modest efforts to reduce field exposure. Prudent avoidance is a concept that recognizes that a scientific determination cannot be made that changes in EMF levels will have any effect on health, and thus prudent avoidance advocates only a modest effort in making such changes. <u>The question of what is "modest" will vary depending upon the specific project</u>. (PECO Rebuttal Statement No. 6 [Silva] at 15-16, 18).

The addition of the underlined language to this finding will clarify that efforts to exercise "prudent avoidance" may range broadly, depending upon the size and projected costs of a proposed line. Again, this distinction is very important considering the ALJ's recommendation to the Commission that it adopt and implement standards which will serve to minimize perceived fear and land-use impacts. I.D. 211-212.

2. <u>Similarity-Based Approach.</u>

At page 129 of the Initial Decision, the ALJ makes Findings of Fact Nos. 51 and 52, which state as follows:

> 51. One approach to prudent avoidance is known as the "similarity-based" approach where levels

of EMF from specific transmission lines are kept similar to levels of EMF from other transmission lines in the same voltage category. This approach was used in New York and Florida (PECO Rebuttal Statement No. 6 [Silva] at 18).

52. The "similarity-based" approach recognizes the assumption that the aspect of EMF exposure which may be important in regard to health is not known (PECO Rebuttal Statement No. 6 [Silva] at 18).

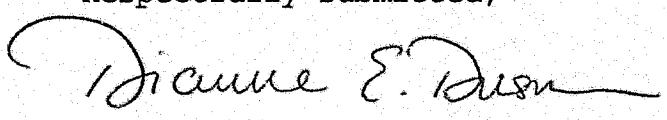
I.D. at 129. The OCA submits that it is also critical to note, when discussing the "similarity-based" approach, an additional fact relevant to an appropriate public policy determination. Specifically, the OCA urges the Commission to add to Finding of Fact No. 52 the following sentence: "The 'similarity-based' approach is not a health-based standard (Tr. 1311 [PECO witness Silva])."

This clarification is particularly important in light of the ALJ's recommendation that the Commission adopt and implement EMF standards. I.D. 211-212.

III. CONCLUSION

For all of the foregoing reasons, the OCA submits that the Commission should adopt the exceptions and recommendations of the OCA.

Respectfully submitted,



Tanya J. McCloskey
Dianne E. Dusman
Assistant Consumer Advocates

Counsel for:
Irwin A. Popowsky
Consumer Advocate

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DATED: September 4, 1992
3744

APPEDDIX A

3 Approved 3-0

PENNSYLVANIA PUBLIC UTILITY COMMISSION
Harrisburg, Pennsylvania 17105

LETTER OF NOTIFICATION OF PENNSYLVANIA POWER & LIGHT COMPANY FILED PURSUANT TO 52 PA. CODE CHAPTER 57 WITH RESPECT TO THE PROPOSED RE-CONSTRUCTION/MODIFICATION OF THE HOSENSACK-UPPER HANOVER 138/69 KV LINE, TO BE RECONSTRUCTED/ MODIFIED, OPERATED AND MAINTAINED IN MILFORD TOWNSHIP, LEHIGH COUNTY

PUBLIC MEETING - AUGUST 20, 1992
JUL-92-E-4*
DOCKET NO. A-110500F.0157

MOTION OF CHAIRMAN DAVID W. ROLKA

At this time, I am not prepared to make a finding of whether the replacement of 40 foot "H" frame towers with 85 to 100 foot steel poles does or does not constitute a substantial alteration of the existing right of way for this proposed transmission line modification/reconstruction. While PP&L has suggested that prior PUC cases support this conclusion, the proposed order does not address this contention in detail. At this point, I believe that the Protestant has raised a factual issue appropriate for hearing.

In addition, it is unclear how the common pleas court dispute between PP&L and the protestant, concerning the interpretation of the right of way agreement relates to our proceeding. While PP&L contends that the common pleas court action is not at all related, that is not at all clear. A PUC order which would approve PP&L's letter of notification may present a catch 22 situation for the protestant: the courts, not the PUC, would interpret the right of way agreement, and relying on the doctrine of primary jurisdiction, PP&L could argue that the court is bound to accept the PUC's finding of no substantial alteration. Under these circumstances, a hearing on the protest should be granted prior to disposition of this letter of notification.

THEREFORE I MOVE THAT:

1. This matter should referred to the OALJ for hearing and preparation of an initial decision; and

2. CEEP should prepare an appropriate order consistent with this Motion.

Aug 18 1992
DATED

David W. Rolka
DAVID W. ROLKA, CHAIRMAN

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P. O. BOX 3265, HARRISBURG, Pa. 17120

LAW BUREAU
MPK

September 8, 1992

IN REPLY PLEASE
REFER TO OUR FILE

John G. Alford
Pennsylvania Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105-3265

DOCUMENT FOLDER

RECEIVED
SEP 08 1992

Re: Letter of Notification of Philadelphia Electric Company for the Woodbourne - Heaton 230 KV Line, Docket No. A-110550F055.

Dear Mr. Alford:

Enclosed for filing please find an original and nine copies of the document Exceptions of the Law Bureau Prosecutory Staff to the Initial Decision of Administrative Law Judge Herbert Smolen. Enclosed also find a Certificate of Service.

Sincerely yours,

Patricia Krise Burket

Patricia Krise Burket
Assistant Counsel

RLS

Enclosures

cc: Parties
(w/ enclosures)

ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138KV Line to Operate as the Woodbourne - Heaton 230 KV Line in Montgomery and Bucks County	:	Docket No. A-110550F055

DOCUMENT FOLDER

RECEIVED
SEP 08 1992
Public Service Commission
Secretary's Bureau
Information Control Division

DOCKETED
SEP 16 1992

EXCEPTIONS OF THE LAW BUREAU PROSECUTORY STAFF TO THE INITIAL DECISION OF ADMINISTRATIVE LAW JUDGE HERBERT SMOLEN

Pursuant to 66 Pa. C.S. §335, the Law Bureau Prosecutory Staff (Prosecutory Staff) hereby files the following exceptions to the Initial Decision of Administrative Law Judge (ALJ) Herbert Smolen, issued August 19, 1992:

1. THE A.L.J. DETERMINATION, THAT "THE FEAR OF ELECTROMAGNETIC FIELDS IS REASONABLE IN LIGHT OF THE UNCERTAINTY OF CURRENT SCIENTIFIC EVIDENCE" IS INCONSISTENT WITH PENNSYLVANIA CASE LAW ON "FEAR", IS OUTSIDE THIS COMMISSION'S AUTHORITY AND EXPERTISE TO MAKE, AND IS UNSUPPORTED BY SUBSTANTIAL EVIDENCE.

a. The ALJ's conclusion of law that "the fear of electromagnetic fields is reasonable in light of uncertainty of

current scientific evidence" is inconsistent with Pennsylvania case law which requires that a tangible factual basis be established for fears before the fear can be considered to be reasonable.

Under Pennsylvania case law, an appellate court's scope of review is limited to whether an error of law was committed, or whether agency findings, determinations or order were supported by substantial evidence. U.S. Steel v. Pa. PUC, 69 Pa. Commonwealth Court 134, 450 A.2d 1073 (1982). Moreover, under 66 Pa. C.S. §703, the Commission in rendering an opinion after a hearing must make findings in sufficient detail to enable the court on appeal, to determine the controverted question presented by the proceeding, and whether proper weight was given to the evidence.

In this proceeding, the ALJ did not make a specific conclusion of law about the reasonableness of the Protestants' fear in regard to electromagnetic field (EMF) exposure, but did nonetheless determine that the "Protestants' fear of EMF is reasonable in light of the uncertainty of scientific research". Initial Decision, p. 197.[1/] This determination amounts to a conclusion that "fear of the unknown is reasonable", and runs

---

[1/] Parenthetically, such a conclusion must necessarily be implied so that the Protestants' decisions to limit the use of their properties because of their alleged fear of EMF would seem to be valid to support the remedy recommended by the Administrative Law Judge -- delay in energization of PECO's Woodbourne - Heaton 230 KV Line. Initial Decision, pp. 211-212.

counter to Pennsylvania case law, which requires that there be a factual basis for fear.

Pennsylvania case law requires that "fear" whether used as a compensable component of damages for personal injury must have an actual factual basis. Neiderman v. Brodsky, 436 Pa. 401, 261 A.2d 84 (1970) (Supreme Court established a cause of action for negligent infliction of emotional distress where the complainant's injury resulted from his reasonable fear of injury); Covello v. Weis Markets, Inc., No. 2690 Philadelphia 1991, 1992 Pa. Super. LEXIS 1701 (June 24, 1992) (In an action for negligent infliction of emotional distress, policeman, who witnessed an individual who was crushed to death by a trash compactor, failed to satisfy the requirement that he reasonably feared for his safety where the policeman arrived on the scene after the victim had become entrapped). An actual factual basis must also be established when fear is raised as a justification for some action on the part of the State or an individual. Gwin v. Unemployment Compensation Board, 58 Pa. Commonwealth Ct. 69, 427 A.2d 295 (1981) (In a case of involuntary discharge, the claimant had good cause to refuse to operate a vertical boring machine because of his reasonable fear of operating the machine, his fear being based on his being previously injured by the machine, other workers being injured by the machine and the company putting a safety guard on the machine after the claimant was discharged); Break N Eat Corporation v. UCBR, 60 Pa. Commonwealth Ct. 13, - A.2d -

(1981) (Claimant's fear and emotional reactions, which were caused by a severe beating imposed upon him on his last day of work were grounded in reality and compelled him to voluntarily terminate his employment); Commonwealth v. Cortez, 507 Pa. 529, 491 A.2d 111 (1985), Commonwealth v. Hook, 313 Pa. Super. 1, 459 A.2d 379 (1983) (Where in the course of investigating behavior which leads an experienced policeman to believe that criminal activity may be afoot, and that the person with whom he is dealing may be armed and presently dangerous, where he identifies himself as a policeman and makes reasonable inquiries and where nothing in the initial stages of the encounter serves to dispel his reasonable fear for his own or others safety, he is entitled for the protection of himself and others in the area to conduct a carefully limited search of the outer clothing of such persons in an attempt to discover weapons); Estate of J.J.E. v. Doe and Roe, 388 Pa. Super. 589, 592, 566 A.2d 285, 287 (1989) (Unsubstantiated fears cannot serve to justify discrimination on the basis of AIDS infection). In order to use "fear" as a basis for invoking the Fifth Amendment right against self-incrimination or as a criminal defense there must be established an actual factual basis for that fear to be adjudged reasonable. In re Estate of Baehr, 408 Pa. Super. 172, 596 A.2d 803 (1991) (The totality of the circumstances presented in the record must be examined to determine whether a witness invoking the Fifth Amendment privilege against self incrimination has reasonable cause to

fear prosecution); Commonwealth v. Morningwake, 407 Pa. Super. 129, 140, 595 A.2d 158, 164 (1991) (The three elements which must be shown to establish a duress defense are: (1) an immediate or imminent threat of death or serious bodily injury; (2) a well grounded or reasonable fear that the threat will be carried out; and (3) no reasonable opportunity to escape the threatened harm except by committing the criminal act).

However, in the instant case the reasonableness of the Protestants' fear of electromagnetic fields as found by the ALJ is based on "current uncertainty of the scientific research." Initial Decision, p. 197. Again, according to the ALJ, the Protestants' fear of the unknown is "reasonable" and based on this fear of the unknown the Protestants should be given a remedy to compensate for their illusionary injury.

The ALJ's determination about the reasonableness of fear of the unknown and the award of any remedy based on that determination is patently absurd considering, by way of analogy, that an unemployment compensation claimant must have a reasonable basis for his fear in order to collect unemployment compensation if the fear compelled him to voluntarily terminate his employment. In Eckenrode v. Unemployment Compensation Board, 111 Pa. Commonwealth Ct. 289, 533 A.2d 833 (1987), a nurse claimed that her fear of performing phlebotomies outside the hospital setting would increase her risk of exposure to respiratory infection constituted good cause for refusal of the assignment, and for

the termination of her employment. The Court evaluated the circumstances surrounding Eckenrode's fear and stated that:

> [t]he totality of the circumstances here, however, reveals that Claimant's fear of infection was neither substantial nor reasonable. Claimant did not testify that her fear of performing the outside phlebotomies was the result of a past bad experience; nor did she testify that she feared performing the identical procedures in the hospital. Although Claimant provided a certification from the doctor that stated that her fear of increased risk of infection "may very well be substantiated," that certification did not restrict her from performing phlebotomies, but only recommended that she avoid performing them outside of a hospital setting. No reason for this restriction, however, was proffered, and absent a medical reason for such a conclusion we believe the restriction is illogical and untenable. In addition, Claimant herself completely failed to establish exactly how performing the procedures on Pleasant Manor patients would increase her risk of exposure to infections. We conclude, therefore, that Claimant's subjective fear of performing the phlebotomies on patients outside of the hospital, in light of the circumstances, was neither substantial nor reasonable so as to provide good cause for refusal of Employer's work assignment.

See also, Brennan v. UCBR, 87 Pa. Commonwealth Ct. 265, 487 A.2d 73 (1985) (Claimant denied unemployment compensation benefits where record showed a lack of any reasonable basis for claimant's fear for her safety resulting from leaving work an hour later).

Even in cases involving fear of cancer after occupational exposure to asbestos in personal injury cases, the complainant is required to establish a reasonable basis for that fear. In James and Grace Sutcliffe v. G.A.F. Corporation, 15 Phila. 339, 1986 Phila. City Reporter LEXIS 22 (February 19, 1986), the court recognized that (emphasis added):

> [w]hether damages should be awarded for fear of developing cancer and mesothelioma is directly related to the issue of risk. Unless there is a legally sufficient foundation for a plaintiff's increased risk of harm, a determination of damages for a plaintiff's fear becomes subjective. There must be some basis upon which a plaintiff's fear can be determined to be reasonable.

In Sutcliffe, the Court rejected the claim of reasonable fear because the plaintiff had not demonstrated the actual increase in risk that he as an individual would suffer, i.e., the actual percentage of those individuals exposed to asbestos who later contract mesothelioma. The court rejected the plaintiff's argument that since the background risk is basically "zero percent" and he is at increased risk as testified to by his expert witness because of his exposure to asbestos, that the plaintiff's risk of developing mesothelioma is 100% greater than the background risk. The court stated that it is important that, the plaintiff establish statistics for the plaintiff and for the average individual (the base rate) for comparison, so that an increased risk for the plaintiff could be calculated.

In contrast, in Rose v. Carey Canadian Mines, Ltd., 20 Phila. 512, 1990 Phila. City Reporter. LEXIS 19 (March 29, 1990), the court found that the plaintiff had established a reasonable basis for fearing that he would contract cancer after he had been told he had asbestosis. The court noted that the plaintiff testified that he constantly worried about developing cancer especially after 1987 when he began spitting up blood after a bronchroscopy.

The applying the totality of the circumstances to the instant the record, the ALJ's determination that, "the Protestants' fear of EMF is reasonable because of uncertainty in scientific research on EMF and health effects is inconclusive", is not factually supportable, and as such, is not legally consistent with prior Pennsylvania cases involving reasonableness of fear.

b. The overwhelming record evidence as well as the findings of fact made, and other conclusions of law advanced by the ALJ on that evidence do not support a determination that the Protestants' fears about EMF are justified and therefore reasonable.

At page 197 of the Initial Decision, the ALJ concluded that "the fear of electromagnetic fields, as testified to by the Protestants, is reasonable in light of the current uncertainty of the scientific research." However, the majority of the evidence produced in this record support

findings that run counter to the proposition that EMF is harmful, and concomitantly, that the Protestants fears are justified. In fact, the ALJ implicitly recognized that the Protestants' fears had no basis. In the Initial Decision the ALJ wrote that (emphasis added):

> [i]n view of all of the foregoing conflicting expert scientific studies, testimony and conclusions on the issue presented, i.e., whether exposure to EMFs causes adverse human health effects, the evidence of record in this proceeding, taken as a whole, leads to the ultimate finding and conclusion that the scientific studies at present are inconclusive; and therefore, the record evidence does not support a finding and/or conclusion that such exposure is harmful to human health. That is to say, that there has been no clear and convincing demonstration of such causality, nor is the preponderance of the evidence sufficient to support such a finding and/or conclusion. Thus, within the framework of the issue framed by the Commonwealth Court and the Commission in this case, it cannot be said that the record evidence supports a finding and/or conclusion that exposure to EMFs causes adverse human health effects. The scientific evidence of record is inconclusive at this point in time.

Initial Decision, pp. 178-179.

This conclusion is reiterated by the ALJ later in the Initial Decision's as a conclusion of law.

> The preponderance of the record evidence in this proceeding does not support a finding or conclusion that there is a definite causal connection between exposure to EMFs and adverse human health effects because of the inconclusive nature of scientific

research and studies presented in this proceeding, when viewed in totality.

Initial Decision, Conclusion of Law No. 4, p. 210

Although the above conclusion of law is cautiously worded it is evident that the ALJ recognized that the preponderance of the evidence shows no health effects conclusively related to EMF exposure.

Findings supporting the proposition that no health effects have been conclusively linked to EMF were also made by the ALJ and include:

> 36. There is not enough sufficient conclusive information to know whether very low frequency electromagnetic fields are dangerous to people and which of their characteristics might be dangerous (N.T. 360; PECO Rebuttal Statement No. 2 [Cole] at 28; PECO Rebuttal Statement No. 3 [Gelmann] at 23; PECO Rebuttal Statement No. 4 [Rosenberg] at 21).
>
> 37. Although biological effects are observed to be associated with EMF exposure, no connection between EMF exposure and human cancer has been conclusively demonstrated (N.T. 368; OCA Statement No. 1 [Janes] at 10).
>
> 38. A causal connection between the biological effects of electric and magnetic fields and harm to human health has not been scientifically proven, nor has a causal connection been disproven (OCA Statement No. 1 [Janes] at 10).
>
> 40. Taken together, the epidemiologic reports are inconclusive with respect to an association/effect relationship between EMF and cancer among human beings. Therefore, to date, no demonstrated relationship between EMF and cancer in human beings is

established (PECO Rebuttal Statement No. 2 [Cole] at 28; OCA Statement No. 2 [Rosenbaum] at 3-4 line 11 to p. 5, line 11).

41. The biophysical and biological mechanisms giving rise to the effects of EMF exposure are either not known or are poorly understood at the present time (OCA Statement No. 1 [Janes] at 10).

42. Effects of EMF observed through cellular studies cannot be directly extrapolated to animals (OCA Statement No. 1 [Janes] at 10).

43. The nature and extent of risks to human health posed by exposure to EMFs are uncertain (OCA Statement No. 2 [Rosenbaum] at 8).

Moreover, other findings made by the ALJ relating to the EMF levels expected during the operation of the line, the distance of Protestants' properties from the line and the physical behavior of electromagnetic fields do not support a finding that the Protestants' exposure to EMF will be increased significantly by the Woodbourne - Heaton 230 kV line. In proving the totality of the circumstances regarding the reasonableness of "fear of cancer" in the aforementioned asbestos tort cases, Sutcliffe and Rose, supra., the plaintiffs needed to show that they indeed were exposed to asbestos. By analogy, the case law is thus contrary to the ALJ since the instant record does not support the fact that the Protestants "exposure" to EMF will be significantly increased by energization of the line.

According to ALJ findings, PECO's Woodbourne - Heaton 230 KV line will operate 90% of the time under light or normal loading operating conditions, and the maximum magnetic field levels expected under these conditions at the edge of the right-of-way (ROW) (30 feet from the centerline of the ROW) is expected to be 25 milligauss (Initial Decision, Findings of Fact Nos. 5, 6, 28 and 29, pp. 118, 123-124). Considering that electric and magnetic fields decrease with distance from the source (Initial Decision, p. 16), and that the nearest property to line is 37 feet at one corner, the contribution of the Woodbourne - Heaton 230 kV line to the Protestants' environment as a whole is not expected to be significant (Initial Decision, Finding of Fact No. 65, pp. 131-132; PECO Exhibit No. 2, p. 15, N.T. p. 70-71).

Most importantly, in contradiction to the ALJ's finding, the Protestants did not testify that their fear of EMF was based on uncertainty of scientific research. The vast majority of the Protestants testified that they were afraid because they read or heard about EMF from television reports, magazine and newspaper reports and literature distributed by PAUSE (N.T. pp. 111-112, 139, 147, 155, 166, 173, 201-203, 208-209, 215-216, 222, 233, 242-243, 253, 260, 440, 471, 484, 490 and 495). However, the literature distributed by PAUSE, was found implicitly by the ALJ to be one-sided as it did not state that there is not a health risk or only a slight health risk associated with EMF (Initial Decision, Finding No. 68, p. 132,

N.T. p. 495). From the testimony cited it would seem that the Protestants' fears are based on their own erroneous assessment of the scientific research, perhaps colored by their sources of information, that there are proven adverse health effects from EMF. Thus, there is no sufficient evidentiary support for the ALJ's attribution of the uncertainty of scientific literature as the basis of Protestants' fear of EMF, which would, under the totality of circumstances analysis, justify their fear. Initial Decision, pp. 125-127.

The Prosecutory Staff notes that the ALJ made only one finding of fact about the reasonableness of Protestant's concerns and fears about EMF. Finding of Fact No. 69 at p. 132 of the Initial Decision. In so doing, the ALJ relied on one piece of evidence -- a single sentence in the statement of OCA's witness David Janes. The actual sentence appears as part of a summary at the end of Mr. Janes testimony and reads as follows:

> 'Since weak electric and magnetic field effects occur, the possibility of harmful effects cannot be summarily or categorically rejected and concerns about harmful effects are legitimate.

OCA Statement No. 1, p. 10.

This is the only statement appearing in the entire record which addresses the validity of concerns about EMF. Moreover, the ALJ's analysis notwithstanding, that statement does not represent an evaluation of the totality of the circumstances to determine reasonableness of the Protestants'

fear of EMF, as is required under Pennsylvania case law involving reasonableness of fear. As already explained the possibility that something will happen is not enough under Pennsylvania law to establish the reasonableness of fear. See Exception 1a, pp. 1-8. Therefore, the ALJ's determination about the reasonableness of the Protestants' fears of EMF are neither supported by substantial evidence nor legally supported in light of Pennsylvania case law.

c. Any determination about the reasonableness of fear of EMF or any other modality is outside the authority and expertise of the Commission and should not be made.

Administrative agencies are creatures of statute and cannot exercise powers not explicitly given to them. Bloomingdale's by Mail, Ltd. v. Dep't of Revenue, 101 Pa. Commw. 431, 516 A.2d 827, 829 (1986). Thus, an agency such as the PUC can exercise only those powers conferred upon it by the legislature in clear and unmistakable language. Lookenbill v. Garrett, 340 Pa. Super. 435, 490 A.2d 857, 861 (1985). A doubtful power does not exist, and an agency must act within strict and exact limits as statutorily defined. Borough of Blawnox Council v. Olszewski, 505 Pa. 176, 477 A.2d 1322, 1327 (1984). An administrative agency cannot by mere usage invest itself with authority or powers not fairly or properly within the legislative grant. Com. v. American Ice Co., 406 Pa. 322, 178 A.2d 768, 773 (1962). Accordingly, an agency's decision

cannot stand where the agency has exceeded its statutory grant of power. See Baptist Childrens' House, supra, 414 A.2d 161.

Although the Public Utility Commission does have regulatory power over public utilities under its general powers at 66 Pa. C.S. §501, that authority extends only to subjects covered by the Public Utility Code. Springdale Township v. Allegheny County Board of Property Assessment, Appeals and Review, 467 A.2d 74, 78 Pa. Commonwealth Ct. 100 (1983). Public utility law envisions that the Commission has jurisdiction over matters relating to reasonableness of utility services, facilities and rates, as well as over other matters concerning the utility's formation of reasonable rules and regulations governing the conditions under which service, facilities and rates shall be rendered, constructed or imposed. DeSanto v. Dauphin Consolidated Water Supply Company v. Pa. PUC, 291 Pa. Superior 440, 436 A.2d 197 (1981). As a rule, under the rule of primary jurisdiction, the courts have been especially willing to defer to the special experience and expertise of the Commission involving matters with its jurisdiction. Elkin v. Bell Telephone Co., 491 Pa. 123, 420 A.2d 371 (1980).

Additionally, the court in Delaware County Community College et. al. v. Fox, et. al., 20 Pa. Commonwealth Ct. 335, 358, 342 A.2d 468 (1975), recognized that the authority of the Commission, as well as other state agencies, extended over certain environmental issues to facilitate the mandate of

Article I, Section 27, of Pennsylvania Constitution, the so-called "Environmental Amendment" (Amendment). The Amendment's mandate is to protect Pennsylvania's public natural resources. The Legislative history of the Amendment made it clear that the amendment was to protect public and not private resources. Prosecutory Staff Reply Brief, pp. 10-12.

The limits of the commission's authority in carrying out the mandate of Article I, Section 27, was circumscribed by the Court in Borough of Moosic v. Pa. P.U.C., 59 Pa. Commonwealth Ct. 338, 343, 429 A.2d 1237, 1240 (1981):

> We view Section 27 to be self executing only as it applies to the Commission's regulation of a utility's own conduct which is within the ambit of the regulatory jurisdiction of the Commission as created by statute and directly affects the environment. Section 501 and 1501 of the Code, 66 Pa. C.S. §§501 and 1501, read together vest in the Commonwealth [the Commission] the power to issue orders and regulations to assure that each public utility provides services and maintains facilities necessary or proper for the safety and the convenience of the public.

The determination of the question of the "reasonableness of fear of EMF" involves an assessment of the psychological condition of an individual in the face of an unproven risk. Such a determination cannot be said to be within the Commission's power to regulate public utility service and facilities, is not within its special expertise as a regulator of public utilities, as it does not relate to

rules, rates or service, and does not directly affect the environment. For these reasons, a good argument can be made that the Commission has no legal authority to make such a determination.

Moreover, such a determination is more appropriately made by the courts. Although the Public Utility Code grants to the Commission general supervisory and regulatory power over public utilities, the Code does not confer an exclusive jurisdiction to decide all matters involving regulated public utilities, and to the contrary, except as otherwise expressly provided in the Code, the Commission's powers and duties do not abridge or alter the existing rights of action or remedies in equity or under common or statutory law of Pennsylvania. Virgilli v. Southwestern Pa. Water Authority, 58 Pa. Commonwealth Ct. 340, 427 A.2d 1251 (1981). Therefore, the Commission should decline to adopt ALJ Finding of Fact No. 69, Initial Decision, p. 132.

2. THE CONCLUSION THAT " THE FEAR OF ELECTROMAGNETIC FIELDS IS REASONABLE IN LIGHT OF THE UNCERTAINTY OF CURRENT SCIENTIFIC RESEARCH" REPRESENTS BAD PUBLIC POLICY, ADVERSE TO THE PUBLIC INTEREST.

The Public Utility Commission has an on-going duty to protect the public from unreasonable rates while insuring the utility companies are permitted to charge rates sufficient to cover their costs and provide a reasonable rate of return.

Metropolitan-Edison Company v. Pa. P.U.C., 62 Pa. Commonwealth Ct. 460, 437 A.2d 76 (1981).

The Administrative Law Judge's baseless conclusion that the Protestants have a reasonable fear of exposure to EMF opens the door to numerous civil litigations under imaginative legal theories such as inverse condemnation, trespass and private nuisance. Legal articles provide "cook books" for lawyers intent on pursuing such claims at the ultimate expense of utilities and their ratepayers. See McCure, Philip S., "The Power Line Health Controversy: Legal Problems and Proposals for Reform", 24 University of Michigan Journal of Law Reform 429 (Winter 1991).

In the instant proceeding, it is clear that one of the primary interests of the Protestants is monetary. Specifically, the interest, as enunciated by their counsel, is to force PECO to purchase their properties as a condition of approval of the Woodbourne - Heaton 230 KV Line. Protestants' Main Brief, p. 13. The observation that the monetary concerns is of primary interest is consistent with the Protestants' testimony about their wanting to sell their properties (N.T. pp. 104-109, 133, 185, 189, 235, 245, 253, 280-282, 442-446, 456-458, 472, 478, 483-484, and 491-492), and with the testimony of their land use expert who characterized the transmission line as a nuisance (N.T. p. 683) -- a claim often raised in adverse condemnation litigation.

The Commission should further recognize that the Protestants' decision not to use certain portions of their property because of the presence of an adjacent transmission line is not a "land use impact" as contemplated under the Commission's siting regulations. 52 Pa. Code §§57.71, et. seq., but again is a novel legal argument which Protestants would like to see adopted by the Commission to use in later court litigation. See Exception 3 below.

To allow to stand a finding or conclusion of law that "the fear of EMF is reasonable based on scientific uncertainty" to stand is tantamount to raising rates for every electric consumer in Pennsylvania while insuring decreased reliability in service as needed new or replacement transmission lines, distribution lines, and substation construction is halted by litigation. The Commission's making such a determination that "fear of the unknown is reasonable" (essentially imposing on the utility industry the obligation of proving the negative) would also diminish the credibility of the Commission as an expert on legitimate utility matters. The instant record establishes the there is no factual basis on which to determine that the fear of EMF is reasonable, and this Commission must have the wisdom and the courage to say so.

Finally, as already explained, the adjudication of the reasonableness of fear is not within the special expertise of the Commission, and is not related to the regulation of public utilities under the general powers granted to the

Commission by the Legislature under 66 Pa. C.S. §501. See Exception 1c, above. Adjudication of issues over which the Commission has no legal authority is a waste of valuable administrative resources. On this basis and to discourage other would-be civil plaintiffs from using this Commission as a cheap forum for discovery or to make a record for use in court, the Commission should decline to make any finding about reasonableness of the fear of EMF.

3. THE CONSCIOUS DECISION OF PROPERTY OWNERS NEARBY A TRANSMISSION LINE TO LIMIT THE USE OF THEIR PROPERTY BECAUSE OF FEAR OF POTENTIAL ADVERSE HEALTH EFFECTS DOES NOT LEGALLY CONSTITUTE AN ADVERSE IMPACT ON "LAND USE".

In the Initial Decision, the ALJ examined the testimony of the Protestants who explained that their use of their property would be significantly changed and limited due to the presence of the line and their fear of potential adverse health effects. Initial Decision, p. 196. He then determined the following:

> By reason of the foregoing, it appears that energization of the line will impact on land use because of this fear of potential adverse health effects.

Initial Decision, p. 197.

As a result of this determination, the Administrative Law Judge concluded that:

> 4. The record in this proceeding supports a finding and conclusion that

> adjoining property owners will limit their use of their property by reason of their fear of exposure to EMF's from the Woodbourne - Heaton Line.

Initial Decision, conclusion of Law No. 4, p. 210.

Law Bureau Prosecutory Staff submits that a conscious decision of a property owner to restrict the use of his land is not a direct impact on the environment and does not fall within the meaning of the term "land use" or "landscape" as those terms are used in the Commission's siting regulations at 52 Pa. Code §57.72(c)(7) and §57.75(e). In its dissertation on the regulatory history of 52 Pa. Code §57.72(c)(7) and §57.75(e) at pages 25-33 of its Main Brief, the Prosecutory Staff attempted to explain the evolution of these two regulations. The purpose of these regulations was solely to allow the Commission to assess the level of environmental impact which would result from siting a proposed line, consistent with its duty to protect Pennsylvania's public resources under the Environment Amendment, Article I, Section 27 of the Commonwealth's Constitution. See Exception No. Ic, above.[2/] See also Prosecutory Staff Reply Brief, pp. 10-12.

[2/] Although the legislative history was presented by the Prosecutory Staff in its Main Brief to show that the terms "land use" and "landscape" were meant to encompass environmental and not monetary (property value) concerns, the history is no less relevant here to show that the term "land use" does not encompass psychological disturbances of landowners.

Moreover, as already explained, the scope of the Commission's authority under Article I, Section 27 has been construed by the Court as follows (emphasis added):

> We view Section 27 to be self executing only as it applies to the Commission's regulation of a utility's own conduct which . . . directly affects the environment.

Borough of Moosic, 59 Pa. Commonwealth Ct. at 338 at 429 A.2d at 1240.

Keeping in mind the extent of the Commission's authority under 66 Pa. C.S. §501 and §1501, any adverse impact on "land use" found by this Commission must be as a result of some conduct of the utility which directly affects the land or the environment, such as the destruction of the 8th hole green of a golf course because of increased soil erosion from improper grading of a utility access road, or the abandonment of pastureland because of accidental spraying of pesticides or herbicides during utility right-of-way maintenance.

In the instant proceeding, the fact that the Protestants choose not to use their backyards because of their alleged fear of electromagnetic fields from a local transmission line is not a direct impact on the environment caused by PECO's 230 KV Woodbourne - Heaton line. At best, it is a remote and indirect effect on private property caused by property owners who choose to restrict their use of their property on the basis of subjective fear.

The Commission should not allow the continuation of this bootstrapping argument that represents a deliberate confusion of environmental law and purpose so as to protect private, (not public) interests. See Prosecutory Staff Reply Brief, p. 12. Accordingly, the Commission should clarify the interpretation of the term "land use" so that it is consistent with the regulatory history and intent of that term in the Commission's siting regulations as presented in the Prosecutory Staff's Main Brief at pp. 25-34.

4. THE REMEDY ORDERED "THAT THE WOODBOURNE - HEATON 230 KV LINE NOT BE ENERGIZED UNTIL AFTER THE COMMISSION SETS STANDARDS FOR ELECTROMAGNETIC FIELDS FOR TRANSMISSION LINE RIGHT-OF-WAYS" IS INCONSISTENT WITH THE INITIAL DECISION'S FINDINGS.

All of the ALJ's findings of fact concerning alleged health effects of electromagnetic field exposure indicate that there is no conclusive scientific proof that electromagnetic fields create any health risk. See Findings of Fact Nos. 36, 37, 38, 39, 40, 42, 43 at Initial Decision, pp. 125-127. See also, Exception Ib, pp. 8-13. These findings indicate that there is insufficient experimental or epidemiological evidence to support a causal connection between EMF and adverse health effects. These findings, which are based on substantial evidence contained in the record, are inconsistent with and do not support the ALJ's order to PECO not to energize the Woodbourne - Heaton 230 kV Line.

5. STANDARDS FOR EMF WHICH COULD BE SET BY THE COMMISSION WILL NOT BE BASED ON SUBSTANTIAL EVIDENCE.

As a remedy to assure the Protestants whose fear of EMF will cause them to restrict the use of their backyards, the ALJ ordered that PECO's Woodbourne - Heaton 230 kV Line not be energized until the Commission sets standards for levels of EMF at the edge of the ROWs of transmission lines. Initial Decision, pp. 208, 211-212. This order was made despite the fact that the ALJ specifically found that it is not known what level or what characteristics of electromagnetic fields are to be avoided:

> 36. There is not enough sufficient conclusive information to know whether very low frequency electromagnetic fields are dangerous to people and which of their characteristics might be dangerous (N.T. 360; PECO Rebuttal Statement No. 2 [Cole] at 28; PECO Rebuttal Statement No. 3 [Gelman] at 23; PECO Rebuttal Statement No. 4 [Rosenberg] at 21).

Initial Decision, p. 125.

Clearly, standards cannot be based on substantial evidence in light of the above finding. As the setting standards which have no concrete basis for their validity is easily recognized as being politically motivated, the Commission should decline to do so, and adopt the policy of prudent avoidance at applicable on a case-by-case basis with reference to levels of EMF from other similar lines for comparison only. See Exception No. 6, below.

6. THE REMEDY ORDERED THAT PECO NOT ENERGIZE THE WOODBOURNE - PECO 230 KV LINE UNTIL STANDARDS ARE ESTABLISH CONSTITUTES A MORATORIUM ON POWER LINES CONSTRUCTION WITHIN THE COMMONWEALTH OF PENNSYLVANIA.

Section 1501 of the Public Utility Code, 66 Pa. C.S. §1501, provides:

> Every public utility shall furnish and maintain adequate, efficient, safe, and reasonable service and facilities and shall make all such repairs, changes, alterations, substitutions, extensions, and improvements in or to such service and facilities as shall be necessary of proper for the accommodation, convenience, and safety of its patrons, employees and the public. Such service also shall be reasonably continuous and without unreasonable interruptions or delay.

Pennsylvania courts have consistently enforced this statutory duty. In Pennsylvania Publication, Inc. v. Pa. P.U.C., 349 Pa. 184, 188, 36 A.2d 777 (1944), the Supreme Court stated:

> It is well established that it is the duty of the telephone company to furnish service and facilities without discrimination in favor of or against anyone who will pay the applicable tariff rates and abide by the reasonable regulations of the utility.

(emphasis supplied). See also Bland v. Tipton Water co., 222 Pa. 285, 71 A. 101 (1908); Ridley Township v. Pa. P.U.C., 172 Super. 472, 94 A.2d 168 (1953); Middletown Township v. Pa. P.U.C., 85 Pa. Cmwlth. 191, 482 A.2d 674 (1984).

The Administrative Law Judge's order that the PECO's Woodbourne - Heaton 230 KV line not be energized until Commission sets standards for EMF at edges of right-of-way effectively acts as a moratorium on power line construction in Pennsylvania, preventing PECO and all other electric utilities from fully complying with 66 Pa. C.S. §1501.

Public policy ramifications of such a moratorium are indeed serious:

A. Service Reliability. Routine reconstruction and extension of transmission lines needed to insure continued service reliability to customers will be halted. The Woodbourne - Heaton 230 kV Line, itself, is a back-up line for use in emergency situations. Not energizing this line compromises service reliability in the homes of the Protestant themselves.

B. Utility's Legal Duty to Provide Service to the Public. Under the Public Utility Code, utilities have a duty to provide service to all members of the public who desire that service. The inability to extend lines to new applicants and to upgrade service to continuing ratepayers will make it impossible for the electric utilities to fulfill their statutory duty.

C. Loss of Economic Expansion. Construction of transmission lines which are built for a single commercial or industrial customer for establishment or expansion of facilities would be halted. The negative economic impact of an

electric utility not being able to provide electric service to a commercial or industrial entity which could benefit of all ratepayers cannot be discounted.

Together with public policy concerns which the Prosecutory Staff has expressed regarding increased electric rates caused by the Initial Decision's determination about the reasonableness of the fear of EMF, Exception No. 1, above, the Prosecutory Staff believes that the Commission must not condition the energization of PECO's Woodbourne - Heaton 230 KV line or any other line on the establishment of standards which are neither legally defensible nor factually supportable. See Exception No. 5, pp. .

7. REQUIRING PECO TO DELAY ENERGIZATION OF THE WOODBOURNE - HEATON 230 KV LINE IS NOT ECONOMICALLY CONSISTENT WITH THE CONCEPT OF PRUDENT AVOIDANCE.

In the Initial Decision, the ALJ stated that (record citations omitted):

> [s]ince prudent avoidance encompasses at least modest efforts to reduce field exposure, and in light of the reasonable fear of potential adverse health effects and actual land use effects due to the current scientific uncertainty concerning EMFs, the Administrative Law Judge agrees with the OCA that the public concerns should not be summarily ignored or dismissed, and therefore recommends that the Commission establish and adopt regulations that set EMF standards, including regulation of the strengths of electromagnetic fields at the edge of power line rights of way; and that pending the adoption of such standards by the Commission, and

demonstrated compliance therewith, energization of the line should be temporarily delayed.

Initial Decision pp. 207-208.

Putting aside the fact that the fear of EMF is not reasonable and that actual land use effects are not due to current scientific uncertainty, delaying energizing of the Woodbourne - Heaton 230 KV line until standards are adopted for EMF levels at the edge of right-of-way does not comport with the concept of prudent avoidance, or with the realities of the instant situation.

Prudent avoidance is, in the context of managing EMF from transmission lines, the strategy of making minimal cost modifications in the design and siting of transmission lines that will help reduce exposure to the public (PECO Rebuttal Statement No. 6, p. 18). The purpose of prudent avoidance, as recognized by the ALJ himself is to allow utilities to continue construction of power lines and other facilities in the face of scientific uncertainty involving health effects from EMF. Initial Decision, p. 204.

The instant record establishes that designing and routing the Woodbourne - Heaton 230 kV line, PECO has done all it reasonably can to lower public exposure to EMF from this line: using the compact delta conformation for the conductors (PECO statement No. 2, pp. 12-13); using phase rolls in stringing the line (PECO Rebuttal Statement No. 6, p. 17); routing the line on an established utility corridor so as to

avoid more concentrated areas of population (PECO Rebuttal Statement No. 5, pp. 11, 12-15); and increasing ground clearance for the line above required levels (PECO Rebuttal Statement No. 4, p. 7; PECO Statement No. 1, p. 10). The ALJ recognized that PECO's Woodbourne - Heaton line already comports with the concept of prudent avoidance, but indicated that this determination was made in the absence of state - mandated standards. Initial Decision, p. 207.

The Prosecutory Staff respectfully submits that establishing standards for EMF will not cause the EMF from this line to be decreased. Requiring that standards be set by the Commission before the line can be energized only gives the Protestants what they want without having them prove an injury.

Furthermore, the delay in energization of the Woodbourne - Heaton kV line, at a construction cost of $19.8 million, is not an economically reasonable step, i.e., modest or low cost, to avoid EMF exposure to Protestants especially when they have shown no direct, tangible injury from the line. The remoteness of injury as described by the ALJ -- a negative impact on land use caused by the Protestants' behavior modification in the way that they use their properties because of their fear of EMF -- does not justify delay in energizing the line. Delay in energizing the line is a drastic response not warranted by the situation and is neither logically nor economically consistent with the concept of prudent avoidance.

In sum, delaying energization of Woodbourne - Heaton 230 kV line in the name of prudent avoidance is as drastic and inappropriate response for avoiding exposure to EMF as is if the Protestants ripped out their household wiring and prohibited the use by their family of every electrically operated toy or appliance so as to avoid EMF exposure. Such drastic responses are not warranted by the uncertainty in scientific evidence on EMF, and at the same time are not justified by this uncertainty.

8. PRUDENT AVOIDANCE SHOULD BE DEVELOPED AND APPLIED ON A CASE-BY-CASE BASIS.

In its Main Brief, the Prosecutory Staff advocated the application of prudent avoidance on a case-by-case basis as follows:

> As an approach to prudent avoidance, Prosecutory Staff favors its application on a case-by-case basis whereby an electric utility must use its expertise in system planning, line route and line design to propose a new, upgraded or replacement line which will allow for reduced levels of electromagnetic field exposure through modest cost efforts. We believe this approach is consistent with Pennsylvania case law which allows the selection of a transmission line route and design of the facilities to be left to the electric utility with review of the reasonableness of the decision left to the Public Utility Commission. Stone v. Pa. PUC, 192 Superior Ct. 573, 162 A.2d 18 (1960); Re Proposed Electric Regulation, 49 Pa. PUC 709, 710-711 (1976).

Prosecutory Staff Main Brief, pp. 39-40.

The Prosecutory Staff also noted its position opposing the "similarity based" approached to prudent avoidance, which approach depends in part on the establishment of standards for limits of EMF at edges of transmission ROWs as follows (footnote omitted):

> In this proceeding, a "similarity based" approach to prudent avoidance was discussed in which the strength of electric and magnetic fields from specific transmission lines, new lines or those being rebuilt or upgraded, must be kept similar to other transmission lines in the same category (PECO Rebuttal Statement No. 6, p. 18). This approach was adopted by regulation in Florida and New York in their establishment of electric field exposure limits at the edge of the right-of-way (PECO Rebuttal Statement No. 6, p. 18). The Prosecutory Staff does not support adopting this approach because of the potential for utilities to do only what is required to meet the upper exposure limit for any given line. However, we do see the value in comparing EMF field strengths from specific lines with those from typical lines so that individual efforts at exercising prudent avoidance can be evaluated in the context of the typical line.

Prosecutory Staff's Main Brief, p. 40.

In conclusion, the Prosecutory Staff supports the application and development of prudent avoidance on a case-by-case basis rather than tying it to compliance with EMF standards. If the purpose of prudent avoidance is, as according to the ALJ, to alleviate fear of EMF potential health effects, Initial Decision, p. 208, prudent avoidance applied on a case-by-case basis should do more to reassure the public

about EMF that each transmission line siting application will be individually evaluated on its merits, consistent with the statutory restraints of Commission authority, for its safety, need, etc., than will the exercise of measuring each line's predicted EMF levels against an arbitrary (at this point in time) yardstick of standards. For all the following reasons, the Prosecutory Staff asks the Commission adopt the development and application of prudent avoidance on a case-by-case basis, and reject the ALJ's recommendation that standards for EMF levels at the edge of transmission line ROWs be established.

9. THE INITIAL DECISION RECOMMENDATION THAT COMMISSION SITING REGULATIONS BE REVISED SO AS TO ALLOW ADEQUATE NOTICE TO ALL ADJOINING PROPERTY OWNERS IS BEYOND THE SCOPE OF THIS PROCEEDING, AND IS UNWARRANTED IN LIGHT OF THE LACK OF ADVERSE EFFECT ON PROTESTANTS, MANY OF WHOM ARE NOT "ADJACENT" PROPERTY OWNERS.

Although he recognized that doing so was outside the scope of this proceeding, the ALJ adopted the recommendation of OCA that the Commission consider modification of its regulations as follows:

> As such, the OCA submits that the Commission should consider amending its regulations to provide adequate notice to all neighboring landowners in transmission line siting proceedings.
>
> The OCA urges the Commission to propose amendments to the regulations, publish them in the Pennsylvania Bulletin and receive public comment on these regulations. It is only in this way that those affected by the

> construction, reconstruction, or reconductoring of transmission lines can be assured of adequate notice and an opportunity to be heard.

Initial Decision, pp. 193, 194.

The rationale relied on by the ALJ, as was presented by OCA, was as follows:

> . . . that the Commission's regulations at 52 Pa. Code §57.72(d) are not adequate to address the emerging concerns regarding EMFs and the effect that such concerns have on landowners adjacent to or near transmission line rights-of-way.

Initial Decision, p. 193.

The ALJ's recommendation ignores the practical arguments on this issue about identifying adjacent property owners which were raised in the Prosecutory Staff's Reply Brief.

These arguments are reiterated here:

> At page 55 of its Main Brief, the Office of Consumer Advocate requests that the Commission amend its siting regulations so as to provide for more comprehensive actual notice to adjacent property owners. OCA counsel does not define the term "adjacent property owner", nor do they suggest the form which such notice should take.
>
> The Prosecutory Staff does not see OCA's proposal as a viable solution to OCA's concern over sufficiency of actual notice of legitimately affected property owners. Unless the term "adjacent property owner" is defined carefully, additional problems may arise. If notice were to be personally given to adjacent property owners, defining "adjacent property owners" as those

> persons owning property within "x" feet of a proposed line's right-of-way, persons owning property within "x + 1" feet of the line may be unfairly excluded from receiving notice. On the other hand, the current practice of defining "adjacent property owners": as those owning property contiguous to the proposed line's right-of-way would exclude those who own property which is non-contiguous to the line's right-of-way but perhaps as close as a few feet away. Parenthetically, under either definition, many Protestants in the instant proceeding still would not have received notice of the Woodbourne-Heaton 230 kV line because many do not own property contiguous to Conrail's property, which contains PECO's right-of-way, and some do not own property within 500 feet of the proposed line (N.T. 165, 172-173, 194, 199, 219, 264 and 475). The Prosecutory Staff, thus, does not see OCA's suggestion as a cure to perceived due process concerns in current notification procedures.

Prosecutory Staff Reply Brief, p. 1.

The Prosecutory Staff instead supported and continues to support the current practice of requiring personal notification property owners whose land will be actually burdened with construction of the line and of providing notice by newspaper publication to all others. To require personal notification of a proposed line to adjacent property owners and those living nearby can be an arduous undertaking and at times, an exercise in futility if the utility has to rely on local tax maps which are notoriously unreliable and out dated.

The Prosecutory Staff believes that:

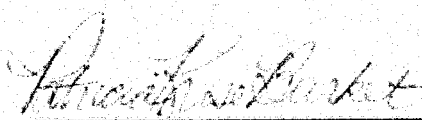
> the newspaper publication requirement not only provides notice of the filing

> to the broadest spectrum of interested individuals, but also eliminates the need to split hairs in defining terms like "adjacent property owners". Considering the problems which has been identified above in defining such a term, Prosecutory Staff believes that providing newspaper notice of Commission transmission line filings is a fairer method of providing notice of such a filing to the public. Moreover, although newspaper publication technically constitutes only constructive notice, general circulation and readership of the popular press effectively assures that meaningful notice will reach all parties potentially impacted by the proposed project.

Prosecutory Staff Reply Brief, pp. 2-3.

WHEREFORE, the Law Bureau Prosecutory Staff respectfully requests that the Commission grant its exceptions to the August 19, 1992 Initial Decision of Administrative Law Judge Herbert Smolen on the Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 KV Line to Operate as the Woodbourne - Heaton 230 KV Line in Montgomery and Bucks County.

Respectfully submitted,



Patricia Krise Burket
Assistant Counsel
Attorney No. 47567

Law Bureau
Prosecutory Staff
Pennsylvania Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105-3265

Date: September 8, 1992

CERTIFICATE OF SERVICE

I hereby certify that a copy of the Exceptions of the Law Bureau Prosecutory Staff to the Initial Decision of Administrative Law Judge Herbert Smolen has been served on this date on the following persons in the manner indicated below:

By First Class Mail

Robert J. Sugarman, Esq.
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Allentown, PA 18101-1179

Ward L. Smith, Esq.
Tom Watson, Esq.
Crowell & Moring
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Washington, D.C. 20004

By Hand Delivery:

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Assistant Consumer Advocate
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Attorney I.D. No. 47567

Pennsylvania Public Utility Commission
P.O. Box 3265
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DATE: September 8, 1992

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P.O. BOX 3265, HARRISBURG, PA 17105-3265

ORIGINAL

September 10, 1992

IN REPLY PLEASE
REFER TO OUR FILE

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SEP 10 1992
Public Utility Commission
SECRETARY'S BUREAU
Information Control Division

John G. Alford
Secretary
Pennsylvania Public Utility
Commission
P.O. Box 3265
Harrisburg, PA 17105-3265

Re: Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as the Woodbourne-Heaton 230 kV Line, Docket No. A-110550F.055.

Dear Mr. Alford:

Attached please find an original and 9 copies of the "Error Sheet" for the Exceptions of the Law Bureau Prosecutory Staff to the Initial Decision of Administrative Law Judge Herbert Smolen in the above captioned matter. After filing this document, a number of typographical and transcriptional errors and omissions of text were discovered. For the sake of clarity, it is necessary to correct these errors.

I regret any inconvenience which may have been caused to the Commission and to the other parties. Please accept my apology.

Respectfully submitted,

Patricia Krise Burket

Patricia Krise Burket
Assistant Counsel
Law Bureau Prosecutory Staff

cc: All parties

DOCUMENT FOLDER

NVL

Error Sheet for the Document, Exceptions of the Law Bureau Prosecutory Staff to the Initial Decision of Administrative Law Judge Herbert Smolen, Docket No. A-110550F.055.

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SEP 10 1992
Public Utility Commission
SECRETARY'S BUREAU
Information Control Division

(underlining indicates corrections)

page 2, footnote 1, line 3 should read:

of their properties (because of their alleged fear of EMF)

page 3, line 3 should read:

Pennsylvania case law requires that "fear" whenever

page 5, line 24 should read:

performing phlebotomies outside the hospital setting because it would

page 8, line 9 should read:

In applying the totality of the circumstances standard to the

page 9, line 2 should read:

harmful, and concomitantly that the Protestants' fears are

page 9, line 35 should read:

Initial Decision as a conclusion of law.

page 11, line 28 should read:

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SEP 17 1992

analogy, the case law is thus contrary to the ALJ's determination since the

page 14, line 6 should read:

about the reasonableness of the Protestants' fear of EMF is

page 14, line 14 should read:

Bloomingdale's by Mail, Ltd. v. Dept. of Revenue, 101 Pa.

DOCUMENT FOLDER

page 15, line 2 should read:

of power. See Baptist Childrens' House v. Industrial Board of Department of Labor and Industry, 51 Pa. Commonwealth Ct. 227, 414 A.2d 159 (1980).

page 15, line 19 should read:

expertise of the Commission involving matters within its

page 17, line 23 should read:

protect the public from unreasonable rates while insuring that

page 19, line 5 should read:

Commission siting regulations, 52 Pa. Code §§57.71 et

page 19, line 11 should read:

is tantamount to raising rates for every electric

page 22, line 9 should read:

Borough of Moosic, 52 Pa. Commonwealth Ct. at 338, 429 A.2d

page 24, line 28 should read:

prudent avoidance as applicable on a case-by-case basis with

page 26, line 22 should read:

statutory duty to serve the public.

page 26, line 12 should read:

Exception No. 5, p. 24.

page 28, line 21 should read:

The instant record establishes that in designing and

page 30, line 3 should read:

inappropriate a response for avoiding exposure to EMF as is if

page 32, line 7 should read:

the Prosecutory Staff asks that the Commission adopt the development

page 32, line 11 should read:

THE INITIAL DECISION'S RECOMMENDATION THAT COMMISSION

page 34, line 30 should read:

notification to property owners whose land will be actually

page 34, line 36 should read:

maps which are notoriously unreliable and outdated

ORIGINAL

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September 15, 1992

John G. Alford, Secretary
Pennsylvania Public Utility Commission
North Office Building
Commonwealth Avenue and North Street
Harrisburg, Pennsylvania 17120

DOCUMENT FOLDER

Re: Letter of Notification of Philadelphia Electric Company at Docket No. A-110550F055

Dear Mr. Alford:

Enclosed herewith for filing are an original and two copies (in counterpart signature form) of a Joint Petition to Intervene of Duquesne Light Company, Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, West Penn Power Company, and UGI Utilities, Inc. A Certificate of Service accompanies this filing.

Very truly yours,

RYAN, RUSSELL & McCONAGHY

W. Edwin Ogden kh

W. Edwin Ogden

WEO/kh

cc: Per Certificate of Service

RECEIVED
SEP 15 1992
SECRETARYS OFFICE
Public Utility Commission

NVL

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Re: Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as the Woodbourne-Heaton 230 kV Line in Montgomery and Bucks Counties	:	Docket No. A-110550F055

CERTIFICATE OF SERVICE

I hereby certify that I have this date served a true copy of the foregoing on the following in accordance with the requirements of 52 Pa.Code § 1.54:

VIA FEDERAL EXPRESS

The Honorable Herbert S. Smolen
Administrative Law Judge
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Dated: September 15, 1992

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Attorneys for Joint Applicants

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SEP 15 992
SECRETARY'S OFFICE
Public Utility Commission

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Re: Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as the Woodbourne-Heaton 230 kV Line in Montgomery and Bucks Counties	:	Docket No. A-110550F055

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SEP 22 1992

JOINT PETITION TO INTERVENE

Pursuant to the provisions of the Commission's rules at 52 Pa.Code § 5.72-§5.74, Duquesne Light Company ("Duquesne"), Metropolitan Edison Company ("Met-Ed"), Pennsylvania Electric Company ("Penelec"), Pennsylvania Power Company ("Penn Power"), West Penn Power Company ("West Penn"), and UGI Utilities, Inc. ("UGI"), respectfully file this Joint Petition to Intervene in the above-captioned matter, and in support thereof set forth the following:

1. Duquesne Light Company ("Duquesne"), a Pennsylvania electric public utility having its principal office at One Oxford Centre, 301 Grant Street, Pittsburgh, Allegheny County, Pennsylvania 15279, owns and operates an integrated electric supply system which provides retail electric service to more than 576,000 customers in an area of approximately 800 square miles, primarily within Allegheny and Beaver Counties, Pennsylvania. Duquesne owns, operates and maintains over 47,532 circuit miles of transmission and distribution facilities within its service territory.

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2. Duquesne is a member of the Central Area Power Coordination Group ("CAPCO"), an interconnected bulk power supply system consisting of Penn Power, Ohio Edison, Duquesne, and two other Ohio electric utilities which serve portions of western Pennsylvania and eastern Ohio.

3. Met-Ed is a Pennsylvania electric public utility with its principal office at 2800 Pottsville Pike, Muhlenberg Township, Berks County, Pennsylvania. Met-Ed furnishes retail electric service to over 400,000 customers in a 3,274 square mile area encompassing portions of 14 counties in Eastern and Central Pennsylvania. Met-Ed owns, operates and maintains, either solely or jointly with other public utility owners, over 18,014 circuit miles of electric transmission and distribution facilities within its service territory.

4. Penelec is a Pennsylvania electric public utility having its principal office at 1001 Broad Street, Johnstown, Cambria County, Pennsylvania. Penelec furnishes retail electric service to more than 500,000 customers within a 17,000 square mile service territory located in 31 counties located in western, northern and south central Pennsylvania, extending from the Maryland state line northerly to the New York state line. Penelec owns, operates and maintains, either solely or with other public utility owners, over 25,424 circuit miles of transmission and distribution facilities within its service territory.

5. The bulk power supply facilities of Met-Ed, Penelec and Jersey Central Power & Light Company (the "GPU Companies") are interconnected and operated as a single integrated power supply system, which in turn is interconnected and operated in concert with facilities of several neighboring non-affiliated utilities in Pennsylvania, New Jersey, Maryland, Delaware, Virginia and the District of Columbia. This interconnected system is referred to as the PJM Power Pool. PJM supplies electricity to over 20 million people in the Mid-Atlantic region of the United States.

6. Penn Power is a Pennsylvania electric public utility with its principal office at 1 East Washington Street, New Castle, Pennsylvania. Penn Power furnishes retail electric service to about 135,000 customers in a 1,517 square mile area encompassing all or part of 6 counties in western Pennsylvania. Penn Power owns, operates and maintains over 5,559 miles of electric transmission and distribution facilities within its service territory.

7. Penn Power is a subsidiary of Ohio Edison Company and operates its electric generation and transmission facilities on an integrated basis with Ohio Edison. Penn Power is a member of CAPCO, as previously noted.

8. West Penn is a Pennsylvania public utility having its principal office at 800 Cabin Hill Drive, Greensburg, Pennsylvania. West Penn furnishes retail electric service to more than 600,000 customers in all or parts of 23 counties in western

and central Pennsylvania. West Penn owns and maintains over 22,490 miles of transmission and distribution facilities within its service territory.

9. West Penn is a subsidiary of Allegheny Power System, Inc., a public utility holding company, whose other principal subsidiaries are The Potomac Edison Company and Monongahela Power Company. The bulk power supply facilities of West Penn, The Potomac Edison Company and Monongahela Power Company operate as an integrated supply system, serving retail customers in parts of Ohio, West Virginia, Virginia, Maryland and Pennsylvania.

10. UGI Utilities, Inc. ("UGI"), a Pennsylvania public utility with an electric utility division having its principal office at 247 Wyoming Avenue, Kingston, Luzerne County, Pennsylvania 18704, owns and operates an integrated electric supply system providing retail electric service to 58,900 customers in northwestern Luzerne and southern Wyoming counties. UGI owns, operates, and maintains over 1,792 circuit miles of transmission and distribution facilities within its service territory.

11. All of the aforesaid utilities are members of regional councils of the North American Electric Reliability Council ("NERC"), an organization which coordinates and promotes reliability of electric utility generation and transmission systems virtually throughout the United States and Canada.

12. The Commission reopened the above case solely to determine whether certain parties should have received notice as

affected property owners of the reconductoring by Philadelphia Electric Company ("PECO"), as a 230 kV transmission line (i.e., the Woodbourne-Heaton line), of a former railroad 138 kV transmission line.

13. The Initial Decision of Administrative Law Judge Herbert Smolen in the above matter was issued on August 19, 1992.

14. The Initial Decision, in making a finding on the sole issue in the case, calls upon the Commission to adopt and implement standards with respect to electromagnetic fields ("EMF"), including the regulation of strengths of EMF at the edge of rights-of-way of "high tension" lines, consistent with the principal of "prudent avoidance". Further, the Initial Decision urges that energization of the PECO line should be temporarily delayed pending the adoption of such standards by the Commission.

15. The Joint Petitioners have not sought heretofore to intervene in the subject proceeding, based upon their understanding that the sole issue in the proceeding was the narrow issue of notice.

16. The portions of the Initial Decision which urge that energization of the PECO line should be temporarily delayed pending the adoption of EMF standards, if adopted by the Commission, could have a significant and adverse impact upon the Joint Petitioners, each of which own and operate extensive electric transmission and distribution facilities in the Commonwealth.

17. Numerous prominent organizations, including the National Cancer Institute and the National Academy of Sciences have concluded that a clear causal connection between EMF and adverse health effects has not been demonstrated. Health-based regulations designed to protect the public from all sources of EMF would be appropriate if sufficient health-based evidence existed to support such a need. However, sufficient evidence does not exist, nor is there any other rational approach for setting exposure regulations to protect public health. Independent scientific commissions in six states recently reaffirmed this conclusion. Moreover, setting standards or policy guidelines covering one of the many sources of EMF (transmission lines) would have little effect towards reducing any genuine fear on the part of the public at large, as evidenced by continued EMF litigation in Florida, one of the two states with a "similarity" based EMF standard.

18. The Commission has carefully evaluated EMF considerations for numerous cases within the overall context of its high voltage transmission line siting regulations adopted in 1978 and amended in 1983. Establishing EMF standards or an EMF policy, outside of the balanced context of (or as an addition to) those siting regulations would be premature, at best, based on the current understanding of the need for such measures.

19. In addition, the concept of land use impacts, applied outside of the intended siting regulations context of environmental assessment, raises a myriad of property issues which

have never before been addressed by the Commission. The broadening of the scope of "land use" draws no support from past precedent or the environmental intent of the siting regulations.

20. Moreover, any moratorium (defacto or otherwise) with respect to the construction of new transmission lines and connections would be a disservice to the public. Public utilities have an ongoing obligation to supply service to its customers. Customers' demand for electricity is expected to continue to grow.

21. In addition, a moratorium preventing new transmission line construction would increase usage of existing transmission paths, which in turn would result in decreased reliability, an adverse impact on economic development, and ironically, higher magnetic fields on existing lines.

22. In view of the potential far-reaching impact of the Initial Decision (in the event that the Commission determines that it should adopt the portions of the Initial Decision as referenced above in paragraphs 14 and 16), the Joint Petitioners respectfully request leave to intervene in the subject proceeding in order to place of record their specific concerns.

23. Obviously, if the Commission determines that it should not adopt the portions of the Initial Decision referenced in paragraphs 14 and 16 above, there would be no need for such intervention.

24. This Joint Petition is being served upon all participants to the above-captioned proceeding as required by the Commission's regulations at 52 Pa.Code § 1.54 and § 5.75.

WHEREFORE, the Joint Petitioners hereby respectfully request, if the Commission should decide to adopt the portions of the Initial Decision referenced above in paragraphs 14 and 16, that (a) it issue such decision as a tentative order nisi, and (b) permit Joint Petitioners to intervene for the purpose of filing a detailed response to such tentative order.

Respectfully submitted,

West Penn Power Company

By_____
John L. Munsch

Penn Power Company

By_____
Stephen L. Feld

Metropolitan Edison Company
Pennsylvania Electric Company

By_____
W. Edwin Ogden
Alan Michael Seltzer
RYAN, RUSSELL & McCONAGHY
530 Penn Square Center
P.O. Box 8281
Reading, Pennsylvania 19603-8281

Duquesne Light Company

By_____
Larry R. Crayne

UGI Utilities, Inc.

By_____
Thomas M. Jackal

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530 Penn Square Center
P.O. Box 8281
Reading, Pennsylvania 19603-8281

Duquesne Light Company

By_____
Larry R. Crayne

UGI Utilities, Inc.

By_____
Thomas M. Jackal

COMMONWEALTH OF PENNSYLVANIA :
: ss
COUNTY OF Allegheny :

DAVID D. MARSHALL , being duly sworn according to law, deposes and says that he is Executive Vice President of Duquesne Light Company ; that he is authorized to and does make this affidavit; that the facts set forth herewith are true and correct to the best of his knowledge, information and belief; and that he expects the Joint Petitioners to be able to prove the same at any hearing hereof.

David D. Marshall

Sworn to and subscribed before me
this 7th day of September, 1992.

(SEAL)

Virginia A. Lewis

Notarial Seal
Virginia A. Lewis, Notary Public
Pittsburgh, Allegheny County
My Commission Expires March 30, 1995
Member, Pennsylvania Association of Notaries

STATE OF PENNSYLVANIA :
: ss
COUNTY OF DAUPHIN :

Michael P. Morrell, being duly sworn according to law, deposes and says that he is Vice President and Treasurer of Metropolitan Edison Company and Pennsylvania Electric Company; that he is authorized to and does make this affidavit; that the facts set forth herewith are true and correct to the best of his knowledge, information and belief; and that he expects the Joint Petitioners to be able to prove the same at any hearing hereof.

M P Morrell
Vice President & Treasurer

Sworn to and subscribed before me
this 10 day of September, 1992.
(SEAL)

Karen Lee Markey

NOTARIAL SEAL
KAREN LEE MARKEY, NOTARY PUBLIC
CITY OF HARRISBURG DAUPHIN COUNTY
MY COMMISSION EXPIRES OCT. 22, 1994

COMMONWEALTH OF PENNSYLVANIA :
: ss
COUNTY OF LAWRENCE :

James R. Edgerly , being duly sworn according to law, deposes and says that he is Vice President of Pennsylvania Power Company ; that he is authorized to and does make this affidavit; that the facts set forth herewith are true and correct to the best of his knowledge, information and belief; and that he expects the Joint Petitioners to be able to prove the same at any hearing hereof.

James R. Edgerly

Sworn to and subscribed before me
this 9th day of September , 1992.

(SEAL)

Sylvia M. Rashid

NOTARIAL SEAL
SYLVIA M. RASHID, Notary Public
New Castle, Lawrence Co., PA
My Commission Expires March 11, 1993

COMMONWEALTH OF PENNSYLVANIA :
: ss:
COUNTY OF WESTMORELAND :

C. S. AULT, being duly sworn according to law, deposes and says that he is Vice President, Division Operations of West Penn Power Company; that he is authorized to and does make this affidavit; that the facts set forth herewith concerning West Penn Power Company are true and correct to the best of his knowledge, information and belief; and that he expects West Penn Power Company to be able to prove the same at any hearing hereof.

C S Ault

Sworn to and subscribed before me
this 9TH day of SEPTEMBER, 1992.

Joyce C Moore
Notary Public

NOTARIAL SEAL
JOYCE C. MOORE, Notary Public
Scottdale, Westmoreland County, PA
My Commission Expires June 19, 1993

COMMONWEALTH OF PENNSYLVANIA :
: ss
COUNTY OF LUZERNE :

AFFIDAVIT

MARK R. DINGMAN, being duly sworn according to law, deposes and says that he is Vice President, General Manager of the Electric Utility Division, UGI Utilities, Inc.; that he is authorized to and does make this affidavit; that the facts set forth herewith are true and correct to the best of his knowledge, information and belief; and that he expects the Joint Petitioners to be able to prove the same at any hearing hereof.

Mark R. Dingman

Sworn to and subscribed
before me this 14th day
of September, 1992.

Sandra M. McCormick
Notary Public

Notarial Seal
Sandra M. McCormick, Notary Public
Upper Merion Twp., Montgomery County
My Commission Expires April 21, 1994
Member, Pennsylvania Association of Notaries

ORIGINAL

SUGARMAN & ASSOCIATES
ATTORNEYS AT LAW
7TH FLOOR, ROBERT MORRIS BUILDING
100 NORTH 17TH STREET
PHILADELPHIA, PENNSYLVANIA 19103
215-864-2500 • FAX: 215-864-2501

ROBERT J. SUGARMAN
ALAN M. KAPLAN
SUSANNE I. GIENDL*

KEVIN M. STACK
LEGAL ASSISTANT
NOT ADMITTED TO PRACTICE IN PENNSYLVANIA

September 17, 1992

RECEIVED
SEP 17 1992
SECRETARY'S OFFICE
Public Utility Commission

BY OVERNIGHT DELIVERY

John G. Alford, Secretary
PA Public Utility Commission
Room G-23, North Office Bldg.
Harrisburg, PA 17120

Re: Letter of Notification of
Philadelphia Electric Company
Re: Proposed 230 KV Woodbourne to
Heaton Transmission Line
Docket No. A-110550, F. 055

Dear Secretary Alford:

Enclosed please find for filing an original and nine (9) copies of the Protestants' Replies to Exceptions of Philadelphia Electric Company, Law Bureau Prosecutory Staff, Office of Consumer Advocate, and Pennsylvania Power & Light in the above-captioned proceeding.

Copies have been served upon all parties of record as shown on the attached Certificate of Service.

Sincerely,

Robert J. Sugarman

RJS:er
Enclosure

cc: All parties of record

pldngs92\coup.916

ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

IN RE: LETTER OF NOTIFICATION OF PHILADELPHIA ELECTRIC COMPANY UNDER 52 PA CODE § 57.72(d) RE: PROPOSED 230 KV WOODBOURNE TRANSMISSION LINE	:	DOCKET NO. A-110S50-F055

RECEIVED
SEP 17 1992
SECRETARY'S OFFICE
Public Utility Commission

PROTESTANTS' REPLIES TO EXCEPTIONS OF PHILADELPHIA ELECTRIC COMPANY, LAW BUREAU PROSECUTORY STAFF, OFFICE OF CONSUMER ADVOCATE, AND PENNSYLVANIA POWER & LIGHT

DOCKETED
SEP 23 1992

ROBERT J. SUGARMAN, ESQ.
Counsel for Protestants
Attorney I.D. #03332

OF COUNSEL:

SUGARMAN & ASSOCIATES
7TH FLOOR, ROBERT MORRIS BUILDING
100 NORTH 17TH STREET
PHILADELPHIA, PA 19103
(215) 864-2500

DATED: September 17, 1992

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A. REPLIES TO PECO'S EXCEPTIONS

1. Reply to PECO's First Exception

In its first exception to the ALJ's initial decision, PECO argues that the Woodbourne-Heaton line meets the Commission's standards for approving a transmission line. This position is consistent with PECO's assertion that the line should be evaluated and approved under the Commission's existing standards (See Exceptions of PECO, 2).

Protestants have argued throughout this proceeding, notably in their Reply Brief, that the existing standards for approving a transmission line do not factor in EMF considerations. The NESC standards, the "similarity-based" approach, and "everyday exposure" considerations, in this vein, do not supply adequate guidance or instruction for determining the health and safety questions surrounding transmission lines and the EMF issue (See Reply Brief of Protestants, 2-6). PECO may assert again and again that this line meets existing safety standards; but so long as the existing standards do not deal with all of the existing risks, dangers and uncertainties, compliance with those standards offers us no assurances that the line is in compliance with standards that stand in need of being enacted.

PECO's confusion stems from an unwillingness to locate the matter of the instant proceeding squarely in the realm of punlic policy where it rightly belongs. The company would like to see the credibility of an appeal to existing standards as independent of the public policy in which those standards would gain any credibility that they may in fact have. If it is poor policy to

base our conclusions about a new issue with respect to transmission lines on a process that doesn't contemplate or address that issue, then the strategy fails. The ALJ has wisely indicated in the Initial Decision that new standards are needed so that they may be applied. This stance is an implicit if not explicit agreement with the Protestants' position that PECO's appeal to compliance with outdated standards--outdated in that they don't even address EMF--is not sufficient to show that the line is safe.

In the introduction to its Exceptions, PECO suggests that the Commission is aware of the EMF issue and gives much thought to whether it should implement EMF standards (Exceptions of PECO, 2). This point strengthens Protestants' claim that existing standards don't address EMF. Further, the fact, as PECO points out, that the Commission has yet to formally consider or adopt such standards makes it perfectly understandable that the ALJ is now calling for such standards as it is very difficult to operate without them as the instant proceeding has demonstrated. Lacking standards against which to compare the Woodbourne-Heaton line, obviously neither the ALJ nor PECO can determine that the line is in compliance with EMF standards. Yet this is what PECO seems to do when it discusses "similarity-basing" and "everyday exposure" for instance (See Reply Brief of the Protestants', 2-6).

PECO continues in its first exception to assert that the line does not cause an unreasonable risk of danger to the safety and health of the public (Exceptions of PECO, 5). But there is an unreasonable risk of danger. There is a risk firstly for the reasons above; i.e., the line has not complied with EMF safety

standards because none are in place yet. In the light of the serious concerns of adverse health effects caused by EMF, to proceed with a line that complies with no EMF standards is unreasonable; that is a dictate of sound policy. There is also a risk because there are scientific studies that indicate adverse health effects of EMF exposure and many scientists who back these findings. And there are both scientists who back these finding and those who dispute them who are jointly advocating continued research. There need not be conclusive evidence of a "causal connection" for there to be conclusive evidence that there is a risk. There is still, for instance, much scientific uncertainty about the connection between cigarette smoking and diseases such as lung cancer. Yet almost no one denies the health risks and manufacturers are required to post warnings.

With regard to land use and environmental impacts, PECO argues that it would be "poor public policy to accept Protestants' declared self-imposed cahnges in future behavior as a 'land use impact' sufficient to warrant disapproval of the line under the Commission's regulations" (Exceptions of PECO, 5). The company adds that it has already minimized impacts given the need for the line, the state of available technology, and available alternatives. Once again PECO fails to acknowledge the complex policy issue at hand. The need for a coherent and well conceived policy to address new developments and new issues cannot be met by adherence to standards and procedures which pre-date in their formulation the very issue at hand. Sometimes the existing procedural apparatus is not sufficient given the needs of wise policy and then that apparatus

must adjust in light of wise and prudent policy. When evaluating whether or not we have a case where the issue is not handled by the existing apparatus, we cannot appeal solely to adherence to existing components of the apparatus. Hence, given the uncertainty surroundin EMF and its possible impacts on Protestants, PECO cannot claim to have minimized impacts where it doesn't even know what the impacts might be. Many Protestants have testified as to the impacts given the unceratinty of the EMF issue, e.g., their fears, their decisions to restrict their use of their property, their feelings that they have no choice but to move. PECO may have tried to minimize these impacts, but it has not and, to date, cannot.

2. Reply to PECO's Second Exception

In PECO's second Exception, the company attempts to discredit and denigrate Protestants' fear of EMF exposure. PECO takes issue with what it considers to be the ALJ's allowing Protestants to "thwart this needed project simply by claiming that they have a fear of EMF...and declaring that they will change their future behavior if the line is energized." PECO later makes explicit its assumption that Protestants have "failed to prove that their EMF concerns are based in fact" (Exceptions of PECO, 8). In addition, as to Protestants' future behavior, PECO claims that it goes beyond prudence (Id., 8).

Protestants object to the simple characterization that they are thwarting a needed project simply by claiming they are afraid of EMF and will change their land use. The Protestants are fearful and they will change their behavior. Hence, they will be adversely

affected by the Woodbourne-Heaton line. It was this assertion that the ALJ set out to affirm or to deny, and the ALJ has affirmed it. Moreover, the ALJ did not simply accept that Protestants said they were afraid as proof of adverse effect. The ALJ made a good faith and extremely thorough effort to examine all of the medical and scientific testimony in addition to Protestants' testimony. In the course of his investigation, the ALJ concluded that Protestants may indeed have relied upon one-sided information as to EMF. But the ALJ did not rely only on this information only. In numerous findings of fact the ALJ found that there were no conclusive proofs of causality between EMF and adverse health effects. The ALJ also understood that causality is a very diificult thing to understand, let alone prove, and that the lack of conclusive proof does not at all rule out relationships and connections between EMF and adverse health effects. In light of this distinction, and in light of studies which link EMF to certain diseases, the call in the scientific community for continuing research, and the attention that the EMF issue is receiving from governing bodies concerned with transmission line safety, one must conclude that fear of EMF is quite reasonable. This conclusion is the one that the ALJ wisely reached.

PECO's reproof to those alleged to be scientifically ignorant enough to not know that it is impossible to prove a scientific negative shows disrespect and insensitivity to the seriousness of the EMF concerns of citizens, doctors, scientists, planners, and legislators. The evidence is inconclusive now, and not just because some scientists can't prove a negative, but because many others are

making a credible claim that they can prove a positive--also a difficult task. Given this scenario, fear is reasonable and certain actions with regard to that fear are reasonable and cannot and must not be ignored.

It is useful to note in this Exception the confidence with which PECO' Woodbourne-Heaton line is thought to serve the "public good," and to be in "the public interest" (Exceptions of PECO, 8; 10). This stance presumes a certainty that the project is needed and that it will do nothing but serve the public good. Although in the most obvious sense "need" in this proceeding has been established, the very weighting process involved in determining need is likely to change as we become more certain as to EMF effects. It is one thing to need a line and quite another to need a line at the cost of public health for instance. Nor can we be sure that a line is in the public interest if it will cause adverse health and land use effects, and possibly cost millions of dollars in ratepayers' money to modify should new EMF research prove its dangers as constructed, located, and operated. Standards such as the ones that the ALJ at least in part contemplates are designed to function in a coherent policy in whicyh elements are carefully considered and weighted with a view to protecting and promoting the public interest.

PECO's fear that in the future all that any citizens opposing a line need do to stop it is express fear and change behavior could be allayed when a policy complete with EMF standards is enacted with the informed participation of citizens. Standards enacted in this matter will not be thwarted by anyone who simply claims to be

afraid.

3. Reply to PECO's Third Exception

Herein Protestants first respond to an exception raised not only by PECO, but also by the Law Bureau and Pennsylvania Power and Light. The common point raised is that the ALJ's recommendation that the Woodbourne-Heaton line be delayed pending the enactment of standards is a de facto moratorium on new line projects (See Exceptions of PECO, 11; Exceptions of Law Bureau, 26; Exceptions of PP & L, 15).

Whether or not approval of the ALJ's recommendation for delay would represent a de facto moratorium may or may not be true. The proponents of energization of the Woodbourne-Heaton line, including two utilities, obviously seek to show the ALJ's decision in its worst possible light in this context, by constructing a worst case scenario. The fact is that there were unique factors involved in this proceeding such as proximity of Protestants to line, the land use patterns of the area, the use of an existing corridor through a residential area, the organization of an informed citizens group, etc... This case proceeded on its own merits. It is true that the state of research on EMF exposure and adverse health effects played a major role; and it is true that that state of research will be a common component in similar cases. However, research may yield new results in the near future which may have a small or great effect on the manner in which the next like case will be viewed.

If it is the case that the whole instant proceeding turned on the state of current scientific research, and that supposition is borne out in future cases where delay is ordered on the same basis,

then there is a greater possibility of a de facto moratorium. Having such a moratorium in place would obviously not be perfect public policy. But the options must be weighed. Proceeding with projects in the face of risk is not good policy. It is not good policy from the standpoint of the monetary and health costs to be borne by the public should EMF prove to closely linked to adverse health effects, even causally connected. It is also not good policy in that it is risk assessment done without the input or even the knowledge of the majority of people affected by the decision. Proceeding with lines is as much a policy decision as is delaying them, and such decision must be made in a policy making forum. In the meantime, granting that policy needs to be formulated, in the present case it represents an abuse of the public to go ahead with a project which the ALJ has determined will adversely effect many people because the utilities fear a de facto moratorium setting precedent.

It is possible that an interim procedure may be worked out to handle cases as they arise while policy and standards are being created. That is not to say that the Commission should hastily adopt something like standard right-of-way levels, but that procedures could be established to help avoid lengthy litigation like the instant proceeding.

PECO raises the interesting argument that it is hard to see what material reduction in fear can be expected to result from standard setting (Exceptions of PECO, 12). It is true that if people like the Protestants see standards that seem not to take

their fears seriously, that seem to be enacted only to allow utilities to proceed, and that seem to have been adopted without public input, they are unlikely to feel any less fear, and perhaps will feel only increased indignation. This seems in part to be a phenomena that follows in part from the way decisions of things like acceptable risk have been made and foisted upon the public, and also from the incoherence in the manner in which utilities, for instance, discuss EMF concerns with the public. The former assertion can be seen in the example of PECO talking about EMF as a societal issue and then going ahead with a line with a minimum of public notification and public input, and the subsequent reaction of citizens who wondered why they were shut out of participation in discussions of a societal issue. The latter assertion as to the effect of a utility's diaolgue with the public was demonstrated by PECO's suggesting that people "consider" the prudent avoidance approach, and then refusing to acknowledge that PECO sees EMF as a risk or a safety concern. That sort of behavior confuses people, makes them fearful, and makes them less likely to trust the next thing they are told.

Thus, the degree to which fear will be materially reduced by the enactment of standards in a broader policy approach will depend largely on how the public is involved in the decision-making process. To this end, the suggestions of the Pennsylvania Power and Light Company in its Exceptions are valuable, though Protestants don't favor them as a substitute for standards (See Exceptions of PP & L, 18-20).

As to section 5 of PECO's third exception, Protestants' still

maintain that PECO did not practice prudent avoidance. That argument will not be restated here (See Reply Brief of Protestants, 19-28). Protestants would reply here to the effect that in the context of policy formulation, prudent avoidance would be a forward looking concept and would be subsumed in the enactment of field standards and mandated procedures for evaluating siting, design, and construction of future lines. Once incorporated in a coherent policy regarding EMF, prudent avoidance as its own independent concept would most likely cease to be the point of contention that it has proved to be in the Woodbourne-Heaton hearings.

B. REPLIES TO LAW BUREAU'S EXCEPTIONS

1. Reply to Law Bureau's First Exception

Like PECO, the Law Bureau takes issue with the ALJ's determination that Protestants' fear of EMF is reasonable in light of the uncertainty of scientific research. The Law Bureau construes the ALJ's finding as tantamount to the conclusion that "fear of the unknown is reasonable" (Exceptions of Law Bureau, 2). This characterization seems grossly unfair and inaccurate when one considers the mass of medical and scientific research that the ALJ used in reaching his conclusion. The fear is owing to the numerous studies which show a relationship between EMF exposure and adverse health effects. The reasonableness is confirmed by the fact that the studies are quite reputable and were conducted by experts in their fields. The reasonableness is confirmed by the number of scientists and legislatorss calling for continued study. The reasonableness is demonstrated by the testimony of scientists on

behalf of PECO to the effect that they could not deny that positive associations have bben shown or that more studies could confirm and hone earlier findings. The current research has been deemed uncertain and inconclusive by many, including the ALJ; on that basis, fear has been deemed reasonable. This sketch shows that we are not dealing with an endorsement of a mere "fear of the unknown."

The Law Bureau does not recognize the distinction btween proving conclusively a causal relationship and uncovering a relationship bewteen something like EMF exposure and adverse health effects; the ALJ does. In the second section of its first exception, the Law Bureau cites a number of sections in the Initial Decision where the ALJ asserts that the evidence does not support conclusive staements about cause and effect (See Exceptions of Law Bureau, 9-11). The ALJ again and again asserts that causality has not been conclusively demonstrated with respect to several sub-issues of EMF-adverse health effect research, but he maintains that the overall picture is inconclusive as many studies and researchers have posited and shown a relationship between EMF exposure and adverse health effects. Thus the ALJ did not recognize that Protestants' fears had no basis as the Law Bureau suggests (Id., 8-9). On the contrary, he has found a sound foundation in the totality of scientific evidence for reasonable fear both because and in spite of the inconclusive nature of the evidence to date.

The reasoning that leads the ALJ to determine that Protestants' fear is reasonable is in fact sound. By loose analogy, if a woman's doctor found a lump in her breast, the woman would

become alarmed. If the doctor ran tests to determine whether or not the lump was cancerous and the test results were inconclusive, wouldn't fear on the woman's part be reasonable? Even if two doctors hypothesized that the lump was benign and one hypothesized that it was malignant? More tests would be done, and all concerned would proceed according to the existing uncertainty, not according to the lack of conclusive evidence that the lump was malignant. The woman would be fearful, and if directed to take precautions, it is reasonable to assume that she would.

Continuing its first exception, the Law Bureau asserts that the evidence in the hearings leads to the conclusion that "the contribution of the Woodbourne-Heaton 230 kV line to the Protestants' environment as a whole is not expected to be significant" (Exceptions of Law Bureau, 12). First of all, the ALJ did not state this conclusion in Finding of Fact Number 65 which is referenced; that Finding states only the distances of the line to different Protestants' property (Initial Decision, Finding of Fact Number 65, 131-132). The fact is, we do not know what effect the line will have on the Protestants' environment except as concerns milligauss levels associated with the line. Any true environmental effect must concern how safety is affected and how land use might be altered; these issues cannot be answered <u>definitely</u> by anyone since knowledge of EMF exposure is limited and inconclusive. More practically, there will be significant levels of EMF exposure at the edge of some Protestants' yards and it is hard to see how this factor, at least, is not significant.

Still in its first exception, the Law Bureau argues that, "The

determination of the question of the 'reasonableness of fear of EMF' involves an assessment of the psychological condition of an individual in the face of an unproven risk," which assessment the ALJ is not qualified to make (Exceptions of the Law Bureau, 16). In another part of its Exceptions, the Law Bureau refers to the "subjective fear" on the part of Protestant property owners (Exceptions of the Law Bureau, 22). Protestants are in the first place at a loss to know what other kind of fear there might be besides "subjective fear." However, the Law Bureau's motive in these two assertions is to suggest that the ALJ's conclusion that Protestants' fears are reasonable is based on nothing other than the fact that they have fears. Protestants again must insist that the ALJ looked at a large picture which included Protestants' testimony as to fear, evidence both supportive and non-supportive of the basis of that fear, and the growing seriousness of the EMF issues in the minds of legislators, planners, homeowners, doctors, and scientists. The basis for Protestants' fear is clearly sound; the ALJ reached this conclusion. Stating that fear is reasonable in light of uncertainty in this context is not an "assessment of the psychological condition of an individual."

2. Reply to the Second Exception of the Law Bureau

This exception asserts that the conclusion that fear of EMF is reasonable in light of current scientific research is bad punlic policy and is adverse to the public interest (Exceptions of the Law Bureau, 17).

It is interesting to note that the Law Bureau considers a

decision made by the ALJ in the void created by a lack of coherent public policy with respect to EMF to be public policy itself. The ALJ is not laying down public policy in concluding that fear of EMF is reasonable. Ehat is necessary is a public policy enacted to deal with all aspects of the EMF issue including both fear and present scientific uncertainty. The call for standards by the ALJ is in effect a call for a coherent policy. In the absence of such policy which will have weighted all factors, the ALJ has concluded that at the very least, fear is reasonable given the uncertainty. To proceed as if fear were unreasonable is to assume that many issues are settled which in reality only the process of making sound policy with public participation will be able to settle. The Law Bureau and PECO would like to think that within the void created by the current lack of policy, to delay energization is to take a distinctive action and to send a new message, while to allow energization is somehow not taking a distinctive action or sending a new message. This thinking is flawed.

Suggesting, as the Law Bureau does, that the ALJ's conclusions as to reasonableness of fear are "adverse to the public interest" is to compound the sort of error made by the flawed thinking described above. Every time that a party suggests that recognizing fear as reasonable is adverse to the public interest, the assumption is that we know for certain that EMF has no adverse health effect. Such an assumption is far from true and the totality of evidence in this proceeding speaks overwhelmingly to its falseness. The public interest is best served by having good public policy that recognizes both pervasive fear and the sound foundation

of such fear.

There is the additional point to be made that were the line energized and EMF proved beyond doubt to be the cause of health problems and serious disease, there is no way to begin to estimate the costs that will ultimately be borne by ratepayers in rectifying the situation--whatever that might mean--not to mention the irreperable damage that may have been done to the health and pyschological well-being of many.

The Law Bureau continues in its second exception to state that "one of the primary interests of the Protestants is monetary" (Exceptions of the Law Bureau, 18). By what means this opinion was reached must strike us as odd. Protestants are people who bought property next to an existing railway corridor. Part of the attraction of their property is the available yard space. The corridor was not deemed by Protestants to be a hindrance to the enjoyment of their yards. The record clearly demonstrates the extent to which Protestants use their yards and common neighborhood areas. Many Protestants explicity stated that they were living in something like a dream home, where they planned to settle permanently (N.T. 145-146, 154, 234, 253-254, 261, 459). Their fear of the line prompted them to have a fear of being in their backyards and homes, a fairly quick realization that they would have to leave to escape the constant exposure to high levels of EMF. The extent to which Protestants are became concerned with monetary matters was owing to the fact that potential buyers too--not just readers of PAUSE literature--were afraid of EMF associated with the proposed line. The fact that Protestants are backed into

a corner by their fear of EMF exposure at home and their inability to sell their homes and move strengthens the foundation of the argument that there are serious land use impacts of the line--both on individuals and on the corridor region as a whole--and not the claim that one of the primary interests of Protestants is monetary. Throughout this proceeding, the Law Bureau has consistently confused questions of adverse land-use impacts with the issue of property values (See Protestants' Reply Brief, 6-7).

Speaking to the issue of land use impact, the Law Bureau says that some conduct of PECO must directly affect the land or the environment. A case which meets the test, it argues, would be where pastureland is abandoned because of accidental spraying of pesticides or herbicides by the utility (Exceptions of Law Bureau, 22). The Law Bureau blindly thinks that the present case is not of this ilk. The pastureland is abandoned because the land is no longer suitable for the enjoyment of the owners; i.e., grazing is no longer safe. Protestants' land would be abandoned or use of it severely restricted because it would be no longer suitable for the enjoyment of the owners; i.e., yard use is no longer safe. PECO and the Law Bureau use words like "self-imposed" and "conscious" respectively to apparently denigrate the decisions of Protestants to change their behavior in order to protect their families from a potential danger. Of course the decisions are "self-imposed" and "conscious," as many decisions are, but they proceed from a rational evaluation of the situation and a fear that the ALJ has quite rightly determined to be reasonable. The fact of the matter is, adverse land use impact considerations must be as broad a

necessary to ensure protection of the environment; that cannot be plausibly denied by the Law bureau.

3. Reply to the Fifth Exception of Law Bureau

The Law Bureau's fifth exception complains that standards for EMF to be set by the Commission will not be based on substantial evidence (Exceptions of Law Bureau, 24). Protestants reply that standards should be set by using the available data and the analysis of experts in policy making, risk assessment, and the relevant scientific disciplines. Further, members of the public will participate in the process. At any rate, Protestants believe and the ALJ strongly implies that standards must be set. When they are set, they will be set given the scientific uncertainty surrounding EMF.

The Law Bureau's exception regarding a de facto moratorium was addressed in the Reply to PECO section of this document.

C. REPLY TO EXCEPTIONS OF PENNSYLVANIA POWER AND LIGHT (PP & L)

The company's discussion beginning at Part B. Section 1 and continuing to Section 3 concerns alleged shortcomings in right-of-way field standards and "similarity basing" as not responsive to the public's fears, not based in science, and in the case of the former, not deemed appropriate by other states (Exceptions of PP & L, 7-12). Protestants have very summarily paraphrased what PP & L discusses in these sections for the purpose of making a general response.

Protestants hope to see tools such as right-of-way standard levels and "similarity-basing" as only part of an integrated public policy approach to the problems of EMF (See pages 7 to 10 of this

reply for elaboration on this theme). This policy approach should proceed with the difficulties that PP & L outlines in mind. The existence of these difficulties is itself a compelling reason for the Commission to set standards in the context of a forward looking policy that takes its shape from the current state of scientific uncertainty.

PP & L's concerns about a de facto moratorium are incorporated in the below reply to PECO's third exception.

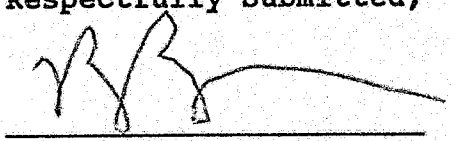
D. REPLY TO THE EXCEPTIONS OF THE OFFICE OF THE CONSUMER ADVOCATE (OCA)

In reply to OCA's exception "A," Protestants support the argument that property values as an evidentiary issue have been confused with the jurisdictional issue (See Exceptions of OCA, 4). Protestants have argued in a related vein with the characterizations of the Law Bureau of land use impacts as monetary matters as is discussed in the reply to the Law Bureau above.

Protestants concur in general with exceptions "B;1" and "B;2" as raised by OCA (See Exceptions of OCA, 7-9). Protestants have maintained throughout the proceeding that questions of cost in prudent avoidance must reflect the possible costs of not proceeding prudently, and so what is a "modest" cost for prudent avoidance will indeed vary. Protestants have also maintained that the

"similarity-based" approach is flawed as a conceptual approach to prudent avoidance in large part because it is not a health based standard.

Respectfully Submitted,



Robert J. Sugarman
Counsel for Protestants

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(215) 864-2500

Dated: September 17, 1992

CERTIFICATE OF SERVICE

Re: Letter of Notification of Philadelphia Electric Company Re: Proposed 230 KV Woodbourne to Heaton Transmission Line Docket No. A-110550, F. 055

I hereby certify that I have this day served a true copy of the foregoing document, Protestants' Replies to Exceptions of Philadelphia Electric Company, Law Bureau Prosecutory Staff, and Office of Consumer Advocate, upon parties of record in this proceeding in accordance with the requirements of 52 Pa. Code §1.54 (relating to service by a participant), in the manner and upon the persons listed below:

Dated this 17 day of September, 1992.

SERVICE BY FIRST CLASS MAIL

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LPW ORIGINAL

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P.O. BOX 3265, HARRISBURG, PA 17105-3265

September 18, 1992

IN REPLY PLEASE
REFER TO OUR FILE

RECEIVED
SEP 18 1992
Public Utility Commission
SECRETARY'S BUREAU
Information Control Division

John G. Alford, Secretary
Pennsylvania Public Utility Commission
P.O. Box 3265
Harrisburg, PA 7105-3265

Re: Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138kV Line to Operate as the Woodbourne-Heaton 230kV Line in Montgomery and Bucks County, Docket No. A-110550F055.

Dear Mr. Alford:

Enclosed for filing please find an orginal and nine copies of the document Commission Law Bureau Prosecutory Staff's Reply Exceptions in the above-captioned matter. Enclosed also find a Certificate of Service certifying that a copy of this document has been served on counsel for all parties.

Sincerely,

Patricia Krise Burket

Patricia Krise Burket
Assistant Counsel

Enclosures

cc: All parties

NVL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SEP 24 1992

Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138kV Line to Operate as the Woodbourne-Heaton 230kV Line in Montgomery and Bucks County:	:	Docket No. A-110550F055

RECEIVED
SEP 18 1992
Public Utility Commission
Secretary's Bureau
Information Control Division

REPLY EXCEPTIONS OF THE COMMISSION
LAW BUREAU PROSECUTORY STAFF

And now pursuant to 52 Pa. Code §5.535(a), the Commission Law Bureau Prosecutory Staff (Prosecutory Staff) submits the following reply exceptions:

I. THE DETERMINATION OF ISSUES INVOLVING PROPERTY VALUE IS NOT WITHIN THE AUTHORITY OF THE COMMISSION AS ESTABLISHED BY STATUTE, OR AS EXTENDED BY THE ENVIRONMENTAL AMENDMENT TO PENNSYLVANIA'S CONSTITUTION AND CANNOT BE ENLARGED BY THE COMMISSION'S OWN PRONOUNCEMENT.

The Prosecutory Staff believes that it has more than adequately covered the law on the statutory and Constitutional constraints on the Commission's authority in regard to "property values", and the proper interpretation of the term "land use" as it appears in the Commission's siting regulations in its Main Brief, pp. 15-34, Reply Brief, pp. 10-12, and Exceptions, pp. 20-23. The Prosecutory Staff does feel compelled to answer the new matter relating to the Commission's consideration of evidence of property value which was raised in exceptions filed by Office of Trial Staff (OTS) and Office of Consumer Advocate (OCA).

At pages 4 to 7 of its Exceptions, OTS takes exception to ALJ Smolen's statement at page 196 of his Initial Decision that "it is appropriate to consider, in the context of the within proceeding, the asserted land use impacts, excluding property value decreases". In so doing, OTS recognizes that the Commission cannot award property damages to Protestants, but argues, nonetheless, that just because the Commission cannot award damages for the taking of a property interest, it does not follow that the Commission cannot consider these matters in its determination of whether a proposed transmission line is in the public interest, or whether it adversely impacts a property owner.

To support its argument, OTS cites language from a pre-hearing order from Judge Robert Meehan in the GPU/Duquesne 500kV Line siting application proceeding, and quotes the following (our emphasis added):

> As I stated during the several prehearing conferences, the Public Utility Commission has no power or authority to order the Applicants to pay damages. That is, if John Doe testifies that the construction of the proposed HV line will cause the value of his property to decrease by $10,000, the Commission cannot order any or all the Applicants [GPU/DLC] to pay any money to John Doe. Only the several courts of common pleas have the authority and power to order the payment of damages. However, as I also stated at those conferences, the occurrence of damages for the taking of property or the extent of property devaluation, etc. are relevant to the

overall determination of whether approval of the application for the proposed HV line will be in the public interest.

Prehearing Order #3 issued July 15, 1992, at Docket No. A-110300F051.

The Law Bureau Prosecutory Staff notes that the statement by ALJ Meehan is artfully crafted, perhaps for political reasons, to appear to say more than it does. What ALJ Meehan says is that the Commission cannot award damages for property value devaluation, but in his opinion, the impact on property values is relevant to the transmission line siting proceeding. Although ALJ Meehan says that it is proper to consider evidence on property values, he does not say that the Commission has the authority to assimilate the evidence to make a determination about the level of damages sustained by a property, which is, in fact, the actual dollar amount representing the loss in market price, allegedly caused by siting or construction of a nearby transmission line. As he had recognized, such a determination would clearly be within the province of the courts, the forums authorized to make awards of damages for injury to property.

ALJ Meehan's opinion on relevancy of property value evidence to the GPU/Duquesne line proceeding does nothing to extend the Commission's statutory authority under the Public Utility Code or the Commission's authority under the Environmental Amendment of Pennsylvania's Constitution, Article I, Section 27 to weigh such evidence and make a finding quantifying the dollar amount by which a property would be

devalued by a transmission line. Moreover, the opinion of a Commission administrative law judge or of the Commission, itself, is not binding legal precedent on reviewing appellate courts.

OCA in its exceptions also quotes with approval the same language from ALJ Robert Meehan's Prehearing Order in the GPU-DQE 500kV Transmission Line case, emphasizing the statement that:

> the occurrence of damage for the taking of property or the extent of property devaluation, etc., are relevant to the overall determination of whether the approval of the application for the proposed HV line will be in the public interest.

OCA Exceptions, p. 6.

The OCA then extorts the Commission not to "don evidentiary blinders, due only to unnecessary deference to a recognized jurisdictional limitation." OCA Exceptions, p. 5.

Taken together, OCA's position is that the Commission should voluntarily disregard the limitation of its statutory and constitutionally granted authority, which even the OCA appears to recognize, and not just hear evidence on possible property value devaluation but also make some sort of determination on the extent of that alleged devaluation because it is in the public interest to do so.

In reply, the Prosecutory Staff submits that only private interests, and not "the public interest", will be served by any Commission determination of the extent to which

property as far as 500 feet away from the Woodbourne-Heaton 230kV Line would be devalued by its presence. Such a finding, as already explained in the Prosecutory Staff's Exceptions on an analogous issue -- reasonableness of fear of EMF -- would only be of use to a private litigant in a property tort case brought on a novel legal theory of nuisance or inverse condemnation, and would only help drive up the costs of acquiring new right-of-ways to the detriment of all ratepayers, a result which is clearly not in the public interest. Prosecutory Staff Exceptions, pp. 17-20.

In its exception, OTS also relies on a Commission order in Re West Penn Power, 68 Pa. PUC 262 (1988), which involved an application for a finding of necessity to exercise eminent domain, to support its claim that the Commission "clearly possesses the requisite authority . . . to consider the impact of property value diminution in assessing HV transmission line impacts." OTS Exceptions, p. 7. In its exceptions, OTS quotes from the order with emphasis added. The Prosecutory Staff repeats the passage here and supplies our own emphasis:

> [1] With regard to the quantum of harm which Galiachatos will suffer, the Court in Kearns v. Pennsylvania, 201 Pa. Super. Ct. 174, 49 PUR 3d 198, 291 A.2d700 (1963), said:
>
> > Whether appellants own two other tracts, whether these tracts constitute a single farm, and the effect thereon by the exercise of the power of eminent domain, are questions relating to damages,

> and must be determined in another forum. cf. Morris v. Commonwealth, 367 Pa. 410, 80 A.2d 762.
>
> Id. at 703. Thus, to the extent that the Exceptions are concerned with the damage which the Galiachatos' will suffer, it must be recognized that the quantum of the damages is not a matter which is within our jurisdiction. That is not to say, however, that the damage which will be suffered by the property owners is not a matter for consideration when we address the matter of a siting application. Although not specifically itemized, in conjunction with our consideration of land use and availability of alternate routes, we consider the impact on landowners; both by reason of the damage and inconvenience which they will suffer. These considerations were resolved by means of the Initial Decision of ALJ Banzoff, which became final on February 26, 1987.

The Prosecutory Staff first notes that ALJ Banzoff's February 26, 1987 Initial Decision referenced above was on the companion transmission line siting application proceeding at Docket No. A-111250,F.005, and did not make any determination on property values. It did mention, however, that George Galiachatos did appear at the hearing and did state that "he did not object to the placement of the line", but that he only "sought to ensure that just compensation would be afforded him as a result of placement of the line." Initial Decision, p. 3. A copy of ALJ Banzoff's February 27, 1987 order is attached.

Secondly, the considerations ["damage and inconvenience to landowners"] which were supposedly resolved by ALJ Banzoff's siting application decision "in conjunction with

land use considerations" did not include an assessment of the damage to the market value of the individual [Gliachatos] property, which would be encumbered by the construction of the line. Instead, the issues considered by ALJ Banzoff with regard to West Penn's siting application were broad, relating to the transmission line's impact on categories of land use:

> The evidence discloses no substantial impact on archaeological, geologic, biologic, historic, natural, scenic, wilderness, recreational, or other significant areas will result from construction, operation or maintenance of the proposed line. If the line is constructed and maintained a proposed, potential disturbance of vegetation or erosion beyond that necessary for construction, operation, and maintenance of the proposed transmission line has been limited by West Penn's specifications for construction, vegetation management, and soil sedimentation and erosion control.

Initial Decision, entered February 26, 1987 at Docket No. A-111250,F.005, p. 11.

The above litany of land use impacts did not include an assessment of damage to the market value of any individual property, including the Galiachatos' property.

Even in ALJ Banzoff's Initial Decision on the companion eminent domain application to which the exceptions were filed in the cited West Penn case, there is no indication that "damages" meant damage to the market value of the property. Although Mr. Galiachatos testified that the proposed route effectively bisects his property and will result in a significant devaluation of the property for purpose of development, ALJ Banzoff made no finding about the devaluation

of the property caused by the line's presence; ALJ Banzoff's findings concern only the location of the proposed line on the property and the reasonableness of the route selected:

9. The right of way sought by West Penn from George and Piye Galiachatos is needed for the construction, operation and maintenance of the Cherry-Run McConnellsburg 138kV transmission line.

10. A resolution of the Board of Directors of West Penn Power dated November 30, 1987, describes right of way sought by West Penn in this proceeding and appropriates said right of way subject to the Commission's certification. The Galiachatos' property has a total acreage of about 153 acres and the proposed route crosses the property in a north-to-south alignment at about the eastern one-third point of the property. The route will traverse the property for a length of 1,757 feet wide.

11. An engineering diagram and an aerial photograph showing the proposed route of the Cherry Run-McConnellsburg Line were submitted as exhibits by West Penn. The exhibits show that the landowners' property is directly in the path of the transmission line as approved by the Commission at Docket No. A-111250,F005. Testimony of a West Penn witness showed that the right of way across the property is the best, least costly, most reliable route for the line upon the property.

12. West Penn has endeavored to purchase the right of way from the landowners, but it has been unable to reach an agreement with

them providing for the sale of the right of way.

13. The right of way does not include streams, rivers or waters of this Commonwealth, or the land covered thereby, or other public property, or property of a burying ground or place of public worship, or a dwelling house or the reasonable curtilage appurtenant thereto.

14. West Penn has not acted arbitrarily, capriciously or in willful disregard of the rights of the landowners, George and Piye Galiachatos, in attempting to secure the right of way for the proposed transmission line.

Initial Decision, issued June 15, 1988 at Docket A-111250,F013, p. 8.

The Commission order adopting ALJ Banzoff's decision on West Penn's eminent domain application then concludes that:

> We affirm, as was found in the prior proceeding, that the route proposed by West Penn is the preferred route among those analyzed, which seem to have included all reasonable alternatives, even considering the substantial damage which it appears may be suffered by the Galiachatos.

Re West Penn Power, 68 Pa. PUC at p. 270, Order entered October 3, 1988 at A-111250F013, p. 17.

While it is clear that the Commission may have considered Galiachatos' testimony in reaching the determination that he would suffer substantial physical detriment to his property, the Commission did not and could not determine the amount of the monetary damages to property values or to his property which he suffered. The Commission's orders on the applications involved in Re West Penn, thus, do not support any

argument that the Commission has authority to determine under its inquiry into impact on "land use" the impact of a transmission line's siting on property values.

To reiterate, the Commission has no statutory authority to determine the value of property without a transmission line on it, or the extent to which the property will be devalued by having a transmission line constructed on it. Therefore, the determination of monetary loss to the value of private property claimed to be caused by the presence of the transmission line, whether on, adjacent to, or nearby a particular property can only be made by the courts.

The Commission should also consider the doctrine of primary jurisdiction. Even if the Commission has the authority to make a finding that a transmission line located on adjacent or nearby property will generally devalue the subject property without fixing a certain percentage of loss in market value, it should refrain from making this finding because a Commission finding may be determinative of the property value issue in the various courts of common pleas. By not making such findings, the courts would be free to determine first whether adjacent transmission lines have a positive effect, negative, or no impact on property values, and then to make an assessment of that impact.

In its exceptions relating to property values, OCA also argues that ALJ Smolen's conclusion that the Commission lacks jurisdiction to hear and determine damages due to alleged

decrease in market value "confuses a jurisdictional issue and an evidentiary issue." OCA's Exceptions, p. 4. The OCA argues further that "although the issue of whether a utility is liable for compensation due to decreased value is not within the Commission's jurisdiction, evidence material to that legal issue may very well also be material to the issues which must be decided by the Commission in a transmission line siting application." OCA Exceptions, p. 5.

The Prosecutory Staff submits that the property value issue which correctly belongs in a trial court involves much more than just fixing liability as OCA seems to suggest. It involves the actual determination by the court of two issues: 1) the issue of whether the proximity of transmission lines have any impact on the value of property; and 2) if there is an impact, positive or negative, a determination of the magnitude of the financial benefit/detriment caused. As already explained, the Commission has no authority to determine the magnitude of the financial impact on the property and the Commission should refrain from making any determination about the first issue as it would involve prejudgment of an issue which could be involved in eminent domain proceedings, or property-based tort cases, involving inverse condemnation, nuisance, trespass, etc.

In the instant proceeding, ALJ Smolen did permit testimony about the property values. Protestant Witness Turner and PECO Witness Van Dyke each offered an opinion as to the

general impact of power lines on the value of adjacent property (PECO Rebuttal Statement No. 5, pp. 13-14; Protestant Statement No. 1, p. 3; N.T. 560-592, 617-618, 677). If the Commission still wishes to make a general finding about the effect of adjacent or nearby power lines on the loss of market value of private property, the evidence is available in the record. However, when the probative value of the record evidence is weighed, the finding should be that nearby transmission lines, or in this case, PECO Woodbourne-Heaton 230kV line has no effect on the value of Protestants' properties.

For all of the above reasons, expressly stated or incorporated by reference, the Prosecutory Staff urges that the exceptions of OTS and OCA regarding the determination of ALJ Smolen that the Commission has no authority to consider property value issues in transmission line siting applications be denied.

II. IT IS UNNECESSARY FOR THE COMMISSION TO LIMIT THE FINDINGS MADE BY THE ALJ ON EMF IN THIS PROCEEDING TO THE RECORD EVIDENCE ADDUCED.

At page 2 of its Exceptions, OTS states that "the Findings and Conclusions in this proceeding concerning EMF health effects must be strictly limited to the evience adduced in this case." OTS Exceptions, p. 2. Specific findings OTS excepts to include Findings Nos. 36-43 and to ordering paragraph No. 2. OTS Exceptions, p. 2. The purpose of the limitation, OTS explains, is that "no party can pre-empt the full airing of these issues in other cases", specifically the GPU-DQE proceeding. OTS Exceptions, p. 4.

The Prosecutory Staff would only note that the record in this case has examined most, if not all, of the major experimental and epidemiological studies which have been conducted involving electromagnetic radiation. The determination of the ALJ Smolen was that this evidence is inconclusive in regard to adverse health effects. Until more and better research is conducted, the basic core of evidence, which does not support a finding of adverse health effect from EMF exposure, will not change. It is a waste of administrative resources to relitigate this issue in each and every Commission proceeding involving electric facilities. Therefore, the OTS's exception should be denied.

III. OCA'S SUGGESTION THAT THE SITING REGULATIONS BE REVISED TO CURE PROCEDURAL DUE PROCES PROBLEMS ASSOCIATE WITH THIS CASE IS OUTSIDE THE SCOPE OF THIS PROCEEDING.

OCA, at page 2 of its Introduction to its exceptions, attempts to relitigate the issue of whether or not PECO should have been allowed to utilize the letter of notification procedure to certificate PECO's Woodbourne-Heaton 230kV Line by raising the issue of whether there was substantial alteration of the right of way. In fact, the OCA argues that there is sufficient evidence in the record to support a finding that PECO substantially altered the original Conrail right of way and that such a finding should be made. OCA points to the fact that there was no electric or magnetic field on the line since 1986. OCA Exceptions, p. 2, footnote No. 1. The purpose of OCA's rehash of this issue is to convince the Commission that its siting regulations need to be revised to cure due process problems presented in this case.

The Prosecutory Staff agrees that the Commission's siting regulations do need to be revised especially to incorporate the recently adopted newspaper notice publication requirement for all Chapter 57 filings adopted by the Commission in connection with a letter of notification filed by West Penn Power Company at Docket No. A-111250,F.038. See Prosecutory Staff's Reply Brief, pp. 1-3. However, we disagree that the alteration of the original Conrail right of way by PECO in the instant case has been substantial.

The record discloses that the new line will be constructed within the 60 foot wide easement, and will use 208 of the original Conrail transmission poles (PECO Direct No. 1, p. 5; N.T. 11). This evidence does not support a finding of substantial alteration to the original right of way.

As to the OCA's contention that the right of way had no electric or magnetic fields on it since 1986, the Prosecutory Staff notes that the majority of the Protestants who testified about the length of time they owned their homes indicated that they owned their homes for more than 4 years and the majority of these individuals testified that they owned their homes for more than 8 years (N.T. 139-140, 164, 165, 186, 209, 222, 237, 263, 438). The record shows that the 138kV line was in operation until 1986 (PECO Direct No. 1, p. 4), and implicitly that at the time the majority of the Protestants purchased their homes, the Conrail 138kV line was in operation. Therefore, the Protestants shouldn't be afforded the presumption that there were no electric or magnetic fields on the right of way. Standing alone, the increase in voltage from 138kV to 230kV represents a change of 92 kilovolts and is not enough to support a conclusion that there has been substantial alteration of the right-of-way by PECO's placement of its Woodbourne-Heaton 230kV Line on the old Conrail right of way.

For the record, the Prosecutory Staff renews its opposition to the setting of electromagnetic field standards

for transmission line right of ways. See Prosecutory Staff Main Brief, p. 40, and Prosecutory Staff Exceptions, pp. 23-32.

WHEREFORE, the Law Bureau Prosecutory Staff requests that the above referenced exceptions be denied.

Respectfully submitted,

Patricia Krise Burket

Patricia Krise Burket
Assistant Counsel
Law Bureau Prosecutory Staff
Pennsylvania Public Utility Commission

P.O. Box 3265
Harrisburg, PA 17105-3265
(717) 783-2810

Dated: September 18, 1992

CERTIFICATE OF SERVICE

I hereby certify that a copy of the Commission Law Bureau Prosecutory Staff's Reply Exceptions has been served on this date on the following persons in the manner indicated below:

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Law Bureau Prosecutory Staff
Pennsylvania Public Utility Commission
P.O. Box 3265
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Date: September 18, 1992

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P. O. BOX 3265, HARRISBURG, PA. 17120

June 15, 1988

IN REPLY PLEASE REFER TO OUR FILE
A-111250F013

DOCUMENT FOLDER

John L. Munsch, Esquire
Deborah M. DePaul, Esquire
Michael D. McDonnell, Esquire
Robert T. Vogler, Esquire
West Penn Power Company
800 Cabin Hill Drive
Greensburg, PA 15601

Application of the West Penn Power Company for a finding that the service to be furnished by applicant through its proposed exercise of the power of eminent domain to acquire right of way for th construction, operation and maintenance of an electric transmission line and related facilities over and across land of George Galiachatos and Piye Galiachatos in Thompson Township, Fulton County is necessary or proper for the service, accommodation, convenience or safety of the public.

TO WHOM IT MAY CONCERN:

Enclosed is a copy of the Initial Decision of Administrative Law Judge Harry G. Banzhoff.

If you do not agree with any part of this Decision, you may send written comments (called Exceptions) to the Commission. Specifically, an original and nine (9) copies of your signed exceptions MUST BE FILED WITH THE SECRETARY OF THE COMMISSION IN ROOM B-18, NORTH OFFICE BUILDING, NORTH STREET AND COMMONWEALTH AVENUE, HARRISBURG, PA OR MAILED TO P.O. BOX 3265, HARRISBURG, PA 17120, within fifteen (15) days of the date of this letter. The signed exceptions will be deemed filed on the date actually received by the Secretary of the Commission or on the date deposited in the mail as shown on U.S. Postal Service Form 3817 certificate of mailing attached to the cover of the original document (52 Pa. Code §1.11(a)). If your exceptions are sent by mail, please use the address shown at the top of this letter. A copy of your exceptions must also be served on each party of record.

If you receive exceptions from other parties, you may submit written replies to those exceptions in the manner described above within ten (10) days of the date that the exceptions are due.

Exceptions and reply exceptions shall obey 52 Pa. Code 5.533 and 5.535 particularly the 40 page limit for exceptions and the 25 page limit for replies to exceptions. Exceptions should clearly be labeled as "EXCEPTIONS OF (Name of Party) - (protestant, complainant, staff, etc.)".

If no exceptions are received within fifteen (15) days, the decision of the Administrative Law Judge may become final without further Commission action. You will receive written notification if this occurs.

cc: ALJ Banzhoff/Office of ALJ/Bureau of S&C/Law Bureau/Mr. Bramson/OSA/Chairman/Commissioners/OTS 3

Very truly yours,

Allison K. Turner

Allison K. Turner
Chief Administrative Law Judge

fao
Encls.
Certified Mail
Receipt Requested Similar letters to:

Richard Kahlbaugh, Esquire
Anne K. Fiorenza, Esquire
McNees Wallace & Nurick
P.O. Box 1166
Harrisburg, PA 17108

Mr. and Mrs. George Galiachatos
13203 Fox Hill Drive
Silver Spring, MD 20906

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Application of the West Penn Power Company for authorization to locate and construct the Cherry Run-McConnellsburg 138 KV transmission line located in parts of Franklin and Fulton Counties	:	A-111250, F.005

DOCKETED
FEB 17 1987

INITIAL DECISION

Before
Harry G. Banzhoff
Administrative Law Judge

History

This proceeding was commenced on May 30, 1986, when West Penn Power Company (hereinafter "West Penn") filed with the Pennsylvania Public Utility Commission an application under 52 Pa. Code, Chapter 57 (Commission review of siting and construction of electric transmission lines), for a certificate of public convenience for authority to locate and to construct West Penn's proposed Cherry Run-McConnellsburg 138 kV transmission line. A prehearing conference was held on July 10, 1986 in Harrisburg, Pennsylvania. The Commission Trial Staff was represented at the prehearing conference by attorneys Terrence J. Buda and Sue Ellen Jurman. Also represented by counsel at the prehearing conference were Wayne and Virginia Crause of Big Cove Tannery, Pennsylvania,

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who had intervened in the proceeding, and who are property owners along the route of West Penn's proposed Cherry Run-McConnellsburg line.

Notice of the first evidentiary hearing on the application was published in newspapers having general circulation within the municipalities in which the Cherry Run-McConnellsburg line is proposed to be located, in accordance with 52 Pa. Code 57.75 (West Penn's Hearing Exhibit Nos. 8, 9, 10 and 11). In addition, West Penn sent letters which provided for notice of the hearing to all property owners and governmental officials and agencies directly affected by the proposed transmission line.

The evidentiary hearing on the Cherry Run-McConnellsburg line siting application was held in Harrisburg, Pennsylvania on November 17, 1986.

Testifying at the hearing on behalf of West Penn were: (1) Richard S. Rogus -- on the present and future necessity of the proposed transmission line; (2) E. Reed Scott, Jr. -- on the safety of the proposed transmission line and operation and the estimated cost of constructing the line; (2) Allan J. Fleissner -- on the general descriptions of the proposed transmission line and the route selection procedure; (4) Sandra K. Shaw -- on the impact of the proposed transmission line on the environment and the availability of alternate routes; (5) Frederick J. Payne, Jr. -- on the construction of the proposed transmission line,

including safety and environmental considerations; (6) Peter E. Spangler -- on the right of way vegetation maintenance program for the proposed transmission line; and (7) Karl V. Pfirrmann -- on the line maintenance practices applicable to the proposed transmission line.

The only intervenors in the proceeding, Wayne and Virginia Crause, who had appeared and were represented at the preliminary hearing in Harrisburg, did not appear at the hearing, despite notice thereof. It was represented by West Penn's counsel at the hearing that Mr. and Mrs. Crause had settled their dispute with West Penn.

Also appearing at the hearing, although not an intervenor to the proceeding, was another property owner along the route of the proposed line, Mr. George Galiachatos. Mr. Galiachatos stated that he did not object to the placement of the line; however, he said he sought to ensure that just compensation would be afforded him as a result of the placement of the line.

Commission Trial Staff was represented at the hearing by attorney Terrence J. Buda.

The written direct testimony of the West Penn witnesses was received in evidence without objection, and there was no cross-examination. The main brief in the way of proposed initial findings of facts and conclusions of law was received from West Penn. There were no other briefs filed.

Findings of Fact

1. Applicant is West Penn Power Company, a public utility incorporated in Pennsylvania for the purpose of supplying light, heat, and power by means of electricity, and having its principal business office at 800 Cabin Hill Drive, Greensburg, Pennsylvania.

2. West Penn plans to construct, operate, and maintain in parts of Franklin and Fulton Counties, a 138 kV electric transmission line connecting its existing McConnellsburg Substation, located near McConnellsburg, Fulton County, Pennsylvania, with its proposed Cherry Run Substation, to be located near the community of Cherry Run, West Virginia.

3. On May 30, 1986, West Penn filed an application for Commission authorization to locate and to construct the transmission line as proposed by West Penn.

4. A hearing on that application was held in Harrisburg, Pennsylvania, on November 17, 1986.

5. The proposed Cherry Run-McConnellsburg 138 kV transmission line is approximately 17 miles in length in Pennsylvania traversing portions of Fulton County and Franklin County as follows:

Fulton County - 16.6 miles (10.1 miles in Ayr Township and 6.5 miles in Thompson Township)

Franklin County - 1,020 feet (1,020 feet in Warren Township)

The line will be constructed primarily on wood pole H-frame structures within a right of way 100 feet in width.

6. The Cherry Run-McConnellsburg 138 kV line will serve four basic functions:

(a) It will provide the McConnellsburg Substation area with a required second transmission supply line;

(b) It will reinforce the transmission supply to the entire South Penn Division of West Penn;

(c) It will provide the Warfordsburg area with an essential transmission source for a planned 138-34.5 kV substation;

(d) It will provide the St. Thomas area an alternate 138 kV supply source for a planned 138-12.5 kV substation.

(West Penn Hearing Exhibit No. 1, pp. 3-4).

7. The evidence demonstrates that the proposed transmission line is the best economic and practical solution to the electric supply problems in the affected areas.

8. The proposed transmission line is designed and will be constructed, operated, and maintained in accordance with the requirements of the National Electric Safety Code as mimimum criteria. (West Penn Hearing Exhibit No. 2, p. 2).

9. If constructed as described in the application and in the testimony, the proposed transmission line should impose no significant health or safety risk.

10. West Penn has undertaken detailed studies to determine and to attempt to minimize the environmental impacts of the

proposed transmission line, and the location and design of the line were evaluated in light of those studies which included archaeologic, geologic, biologic, historic, natural, scenic, wilderness, recreational, social, and cultural features, and existing and future land uses. (West Penn Hearing Exhibit No. 5, pp. 7-9).

11. West Penn's proposed route can reasonably be expected to have as minimal an environmental impact as may be expected from a project of this magnitude.

12. West Penn's selected route can reasonably be expected to have the least adverse environmental impact of the all alternative route.

13. The evidence discloses no substantial impact on archaelogic, geologic, biologic, historic, natural, scenic, wilderness, recreational, or other significant areas will result from construction, operation, or maintenance of the proposed transmission line. (West Penn Hearing Exhibit No. 5, pp. 12-15).

14. If the line is constructed and maintained as proposed, potential disturbance of vegetation or erosion beyond that necessary for construction, operation, and maintenance of the proposed transmission line has been limited by West Penn's specifications for construction, vegetation management, and soil sedimentation and erosion control.

15. As part of its environmental approach to the route selection process, West Penn prepared a line route evaluation, which discusses the studies that were made to insure that routing was used to minimize the environmental impact of the proposed transmission line.

16. The Company compared two general route alternatives in determining the final route, an eastern route and a western route, along with considering several localized route alternatives along the general western route alternative.

17. The eastern route, which would have exited the McConnellsburg Substation in an eastern direction then angled due south, was not chosen by the Company for the final proposed route. The alternative route crossed approximately 10 miles of agricultural land, primarily in the productive northern section of the McConnellsburg valley. The route also would have crossed densely wooded Tuscarora Mountain. The eastern route traversed approximately 6,500 feet of state game land located on Tuscarora Mountain and also crossed the Tuscarora Hiking Trail. Disruption to this mature woodland habitat along with difficulty with obtaining approval from the Pennsylvania Game Commission and potential for excessive visual exposure, all indicated that this was not a desirable locat on for the line. There was also a potential for high erosion into the quality streams along the route. The route also crossed the Union Cemetery. (West Penn Hearing Exhibit No. 4, pp. 4-5).

18. The other alternative, known as the western route, was the alternative chosen by the Company. It traverses the more westerly portion of the study area. The alternative is a total of 25.4 miles in length and crosses approximately three miles of agricultural land, either pastures or cropland. Because much of the agricultural land is interspersed with woodlots along the western alternative, the disruption to the agricultural land will be minimized by placement of the towers on woodlots. Approximately 13 miles of woodlands are crossed by this route. The advantages of the western route included less damage to environmental systems, avoidance of watersheds, and, although much of the terrain is very steep, the line traverses the terrain in such an angle that will minimize potential for erosion. The route also causes less impact on public lands than would the eastern route. Construction on the western route will result in minimal visual impact to both travelers and residents. (West Penn Hearing Exhibit No. 4, pp. 4-6).

19. The placement of the line along the western route is designed to minimize the visual effects of the line. Existing vegetation and woodlots, along with the rolling terrain, were used to minimize opportunities to view the line. (West Penn Hearing Exhibit No. 5, p. 21).

20. The basic factors stated by the company that influenced the location of the route included (1) engineering

criteria mandated by the electrical specification of the line, (2) present and future land use, (3) location of population centers, (4) location of public facilities, (5) location of transportaion routes, (6) location of parks, game lands, and recreation areas, (7) visual aesthetics of the area, (8) the topography of the region, (9) existing vegetation and ground cover for screening the line, (10) available structure types to be used for the project, and (11) economics.

21. West Penn transmission engineers testified that the Cherry Run-McConnellsburg line will meet and exceed the standards of the National Electric Safety Code for overhead electric lines, which includes criteria for structure, design and location, soil and ground foundations, foundation designs, conductor data, and the ordering of materials. The Commission has recognized the National Electric Safety Code as constituting reasonable standards of safe construction and maintenance. West Penn has also designed the line with certain precautionary measures for the structures and conducted cover conditions which may occur in the local area of the proposed line, such as the icing and strong winds during the winter storms.

22. West Penn presented testimony that the electrostatic and electromagnetic effects of a 138 kV line are so weak as to be of no consequence. (West Penn Hearing Exhibit No. 2, p. 4).

23. West Penn documented its transmission construction standards and its processes in selecting and supervising contractors. Testimony indicates that numerous safety practices, all in conformity with regulations of the Occupational Safety and Health Administration, are contemplated for the construction of the Cherry Run-McConnellsburg line. (West Penn Hearing Exhibit No. 3, pp. 3-8).

24. West Penn's safety manual, which contains safety rules more stringent than those of the Occupational Safety and Health Administration will be enforced. The selection of contractors will be a thorough, careful process that considers both the cost of the bids and the quality of the bidders. (West Penn Hearing Exhibit No. 3, pp. 5-9).

25. There will be close supervision of contractors during all stages of the clearing and construction process by Company inspectors assigned to the project.

Discussion

A review of the record of this proceeding has established that the application of West Penn Power Company has complied with the requirements of 52 Pa. Code §57.72 relating to the form and content of the application. In connection therewith the evidence demonstrates that the proposed transmission line is the best economic and practical solution to the electric supply problems in the affected areas. The proposed transmission line is designed

and will be constructed, operated, and maintained in accordance with the requirements of the National Electric Safety Code as minimum criteria and should impose no significant health or safety risk.

The Company undertook detailed studies to determine and to attempt to minimize the environmental impacts of the proposed transmission line. The evidence discloses no substantial impact on archaelogic, geologic, biologic, historic, natural, scenic, wilderness, recreational, or other significant areas will result from construction, operation, or maintenance of the proposed transmission line. If the line is constructed and maintained as proposed, potential disturbance of vegetation or erosion beyond that necessary for construction, operation, and maintenance of the proposed transmission line has been limited by West Penn's specifications for construction, vegetation management, and soil sedimentation and erosion control. As part of its environmental approach to the route selection process, West Penn prepared a line route evaluation. Testimony indicates that numerous safety practices, all in conformity with regulations of the Occupational Safety and Health Administration, are contemplated for the construction of the Cherry Run-McConnellsburg line.

The record further establishes the Company is in compliance with 52 Pa. Code §57.74 relating to filing and service of the application and notice of filing. In that regard the Company in

addition to providing notice of filing the application to all property owners also notified the following: Pennsylvania Game Commission, Pennsylvania Department of Transportation, Pennsylvania Historical and Museum Commission, The Pennsylvania Department of Transportation Bureau of Aviation, and The Federal Aviation Agency Eastern Region.

Finally, the record establishes that the Company is in compliance with 52 Pa. Code §57.75 relating to hearing and notice. Proof of publication was submitted to show that the hearing notice was published in Public Opinion on August 11 and 18; Fulton County News on August 14 and 21; The Morning Herald and The Daily Mail, Washington County, on August 17; Record Herald, Waynesboro, on August 13 and 20. In addition, West Penn sent letters which provided for notice of the hearing to all property owners and governmental officials and agencies directly affected by the proposed transmission line.

Conclusions of Law

1. West Penn has shown sufficient need and engineering justification for the proposed Cherry Run-McConnellsburg 138 kV line.

2. If performed in accordance with the evidence, the construction, operation, and maintenenace of the proposed transmission line will not create an unreasonable risk of danger to or disruption of the public health, safety or convenience.

3. The construction, operation, and maintenance of the proposed transmission line if performed as proposed, will be in compliance with all applicable statutes and regulations for the protection of the natural resources of the Commonwealth.

4. Established as per the evidence, the construction, operation and maintenance of the proposed transmission line will have as little adverse environmental impact as is reasonably possible considering the electrical needs of the public, the state of available technology and available alternatives.

Order

THEREFORE,

IT IS ORDERED:

1. That the application as filed by West Penn Power Company with the Pennsylvania Public Utility Commission at Docket No. A-111250, F.005 for authorization to locate and construct the Cherry Run-McConnellsburg 138 kV transmission line located in parts of Franklin and Fulton Counties is hereby approved.

2. That the transmission line as proposed will be constructed and maintained in accordance with the National Electrical Safety Code.

3. That the transmission line as proposed will be constructed, operated and maintained in compliance with all

applicable statutes and regulations for the protection of the public and the natural resources of the Commonwealth.

HARRY G. BANZHOFF
Administrative Law Judge

Dated: January 13th 1987

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P. O. BOX 3265, HARRISBURG, Pa. 17120

March 5, 1987

IN REPLY PLEASE
REFER TO OUR FILE
A-111250, F.005

Drew J. Kovalak, Esquire
J. L. Munsch, Esquire
D. M. DePaul, Esquire
West Penn Power Company
800 Cabin Hill Drive
Greensburg, PA 15601

Application of the West Penn Power Company for authorization to locate and construct the Cherry Run-McConnellsburg 138 KV transmission line located in parts of Franklin and Fulton Counties.

TO WHOM IT MAY CONCERN:

This is to advise that no timely filed exceptions and no requests for review from the Commissioners have been received within the specified time period to the decision issued in the subject case.

This means that the decision of the Administrative Law Judge is final without further Commission action.

A copy of the final order has been enclosed for your records.

Very truly yours,

Jerry Rich
Secretary

fao
Encls.
Certified Mail
Receipt Requested

Refer to letter dated February 11, 1987

DOCKETED
MAR 9 1987

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ORIGINAL

Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101-1179 • 215/774-5151

Jesse A. Dillon
Attorney
215/774-5013

FAX: 215/774-6726

DOCUMENT FOLDER

September 18, 1992

RECEIVED
SEP 18 1992
SECRETARY'S OFFICE
Public Utility Commission

Mr. John G. Alford, Secretary
Pennsylvania Public Utility Commission
P. O. Box 3265
Harrisburg, Pennsylvania 17105-3265

Re: Letter of Notification of
Philadelphia Electric Company
Relative to Reconductoring and
Rebuilding the Existing Line to
Operate as a Woodbourne-Heaton
230 kV Line in Bucks and
Montgomery Counties
Docket No. A-110500F055

Dear Secretary Alford:

Enclosed for filing is an original and nine (9) copies of Pennsylvania Power & Light Company's Replies to Exceptions. As shown on the certificate of service, copies have been served on all parties of record. In addition, a copy has been served on the Office of Trial Staff, an entity not a party to this proceeding.

Pursuant to 52 Pa. Code §1.11, I have attached U.S. Postal Form 3817 to evidence this filing.

Very truly yours,

Jesse A. Dillon

Enclosures

ORIGINAL

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

LETTER OF NOTIFICATION OF
PHILADELPHIA ELECTRIC COMPANY RELATIVE
TO RECONDUCTORING AND REBUILDING THE
EXISTING LINE TO OPERATE AS A WOODBOURNE-HEATON
230 kV LINE IN BUCKS AND MONTGOMERY COUNTIES

RECEIVED
SEP 18 1992
SECRETARY'S OFFICE
Public Utility Commission

Docket No. A-110500F055

REPLIES OF
PENNSYLVANIA POWER & LIGHT COMPANY
TO OTHER PARTIES' EXCEPTIONS
TO THE INITIAL DECISION OF
ADMINISTRATIVE LAW JUDGE HERBERT SMOLEN
ISSUED AUGUST 19, 1992

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FOLDER

DOCKETED
SEP 24 1992

Jesse A. Dillon
Pennsylvania Power & Light Company
Two North Ninth Street
Allentown, Pennsylvania 18101
(215) 774-5013

Attorney for Pennsylvania Power &
Light Company

Dated: September 18, 1992

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I. INTRODUCTION

Four parties to the proceeding, namely Pennsylvania Power & Light Company ("PP&L"), Philadelphia Electric Company ("PECO"), Law Bureau Prosecutory Staff ("Law Bureau") and the Office of Consumer Advocate ("OCA"), filed exceptions to Initial Decision ("I.D."), issued on August 19, 1992, by Administrative Law Judge Herbert Smolen ("the ALJ"). In addition, the Office of Trial Staff ("OTS"), an entity not a participant in this proceeding, filed a document captioned "Exceptions of the Office of Trial Staff."

Below, PP&L will briefly respond to the document filed by OTS[1/] to the extent that further response is necessary and appropriate. PP&L is not replying to all of the arguments or exceptions of either OTS or the parties to this

---

1/ Because the Commission's regulations, specifically 52 Pa. Code § 5.533(a), provide for the filing of exceptions only by participants in a proceeding, and because OTS is not currently a participant or a party to this proceeding, OTS' submission cannot properly be called exceptions until such time as the Commission or the ALJ grant OTS party or participant status. Furthermore, OTS may be statutorily prohibited from becoming a participant or party to this siting proceeding. See 66 Pa.C.S. § 306(b)(1). In any event, PP&L will respond to OTS' document notwithstanding the fact that OTS is not yet a participant and may not be permitted to become a participant in this proceeding.

proceeding, and the absence of a reply to any argument or exception herein should not be interpreted as either agreement or disagreement with any of the positions of either OTS or the parties to this proceeding.

II. ARGUMENT

A. OTS' Contention that the ALJ's Findings Regarding EMF and Human Health Should be Modified Should Be Rejected

At pages 2-4 of its "Exceptions," OTS contends that numerous findings of fact and an ordering paragraph of the Initial Decision should be modified and limited because, in the highly publicized GPU/DQE Transmission Line proceeding (Docket No. A-110300F051), OTS "will present evidence . . . concerning EMF health effects which would not necessarily be in accord with the findings and conclusions contained in the instant Initial Decision." OTS Document, p. 4. OTS' contention should be rejected for several reasons which are explained below.

1. The ALJ Already Has Limited His Findings to this Proceeding and Further Limitations are Unnecessary

OTS' attempt to limit the ALJ's findings of fact is unnecessary. The ALJ has already explicitly stated that his decision is based only on the record evidence presented by the parties to this proceeding and is not intended to be

some larger scientific EMF treatise surveying all of the research on the EMF issue. OTS evidently lacks confidence in the following passage of the I.D., in which the ALJ clearly stated that:

> The following discussion concerning various scientific studies and the analyses thereof by the various parties is not intended as a definitive scientific treatise surveying the entire field of research on the EMF issue, but is an overview of the material that has been presented of record in this case. Again, it is not presented so that a scientific conclusion can be drawn on the merits of the studies presented, but rather to determine whether the record in this case, taken as a whole, can support a finding of adverse human health effects from exposure to EMFs. I.D. at 134-135 (emphasis in original).

Thus, the ALJ himself has already limited his decision to material "of record in this case" and stated that he was not making broader scientific conclusions on the merits of the issue of EMF health effects. Further limitations are unnecessary.

It may be true that if similar findings of fact eventually are made by the ALJ in the GPU/DQE Transmission Line proceeding, OTS may ultimately be unsuccessful in its as yet unsupported contention that EMFs cause harmful health

effects.[2/] However, such a result would be because OTS is simply proven to be incorrect, not because the ALJ made proper findings of fact in the Woodbourne-Heaton proceeding. Therefore, OTS' proposed limitations are unnecessary.

2. Each of the Specific Findings of the ALJ are Supported by Ample Record Evidence Which Cannot be Ignored or Discounted in the Findings of Fact

In any adjudication, an Administrative Law Judge must make the findings of fact and conclusions of law that are justified by the record evidence and required by applicable law. Otherwise, the Commission, and subsequently the appellate courts, would be unable to adequately perform their role of reviewing the decisions of the ALJ and the

---

2/ Although PP&L obviously has not seen the alleged "evidence" which OTS intends to submit in the GPU/DQE Transmission Line Proceeding, PP&L, in its Main Brief in this proceeding, explained that the mere existence of a "scientific" expert to support a particular position before a court or regulatory body does not necessarily constitute valid scientific proof of anything. PP&L Main Brief, pp. 6-8. Because of the seriousness with which PP&L views this issue and the possible effects on the public of statements and positions of public entities regarding possible adverse EMF health effects, PP&L urges OTS to thoroughly and carefully review all of the extensive EMF evidence and briefs in this proceeding and whatever "evidence" OTS allegedly has to present in the GPU/DQE proceeding to see if there is any valid scientific reasoning or acceptance within the scientific community behind its apparent position on adverse health effects of EMF. See e.g., PP&L Main Brief, pp. 9-42 (no valid scientific reasoning) and pp. 43-45 (no general acceptance within the scientific community).

Commission to see if they are justified by substantial evidence. See, e.g., 66 Pa.C.S. § 703(e); Allegheny Ctr. Assoc. v. Pa. P.U.C., 131 Pa. Commw. 352, 570 A.2d 149, 152 (1990) (Findings must be in sufficient detail to allow a reviewing court to determine the contraverted question presented).

The ALJ's findings questioned by OTS, along with the ALJ's record citations, state as follows:

> 36. There is not enough sufficient conclusive information to know whether very low frequency electromagnetic fields are dangerous to people and which of their characteristics might be dangerous (N.T. 360; PECO Rebuttal Statement No. 2 [Cole] at 28; PECO Rebuttal Statement No. 3 [Gelmann] at 23; PECO Rebuttal Statement No. 4 [Rosenberg] at 21).
>
> 37. Although biological effects are observed to be associated with EMF exposure, no connection between EMF exposure and human cancer has been conclusively demonstrated (N.T. 368; OCA Statement No. 1 [Janes] at 10).
>
> 38. A causal connection between the biological effects of electric and magnetic fields and harm to human health has not been scientifically proven, nor has a causal connection been disproven (OCA Statement No. 1 [Janes] at 10).
>
> 39. Epidemiological studies are inconclusive, i.e., some show associations between surrogates for long-term average field strength and various types of cancer; sometimes there is no apparent correlation when actual measured (short-term) field strength is used instead of the surrogate; other studies have reported either no significant correlation or no relationship between fields or field surrogates and cancer; authors of one study have observed negative correlations between exposure to high magnetic fields and cancer; another study reports increased cancer, but low total death rates (due to less cardiovascular disease

for those exposed to high fields); one study reports higher cancer incidence for people farther from a power line than for people closer to a power line (OCA Statement No. 2 [Rosenbaum] at 3; OCA Statement No. 2A [Rosenbaum] at 2; Protestants' Statement No. 1 [Turner] at 3-4; PECO Rebuttal Statement No. 2 [Cole] at 18).

40. Taken together, the epidemiologic reports are inconclusive with respect to an association/effect relationship between EMF and cancer among human beings. Therefore, to date, no demonstrated relationship between EMF and cancer in human beings is established (PECO Rebuttal Statement No. 2 [Cole] at 28; OCA Statement No. 2 [Rosenbaum] at 3-4, line 11 to p. 5, line 11).

41. The biophysical and biological mechanisms giving rise to the effects of EMF exposure are either not known or are poorly understood at the present time (OCA Statement No. 1 [Janes] at 10).

42. Effects of EMF observed through cellular studies cannot be directly extrapolated to animals (OCA Statement No. 1 [Janes] at 10).

43. The nature and extent of risks to human health posed by exposure to EMFs are uncertain (OCA Statement No. 2 [Rosenbaum] at 8).

As shown by the ALJ's record citations included above, there is more than adequate record evidence for all of the ALJ's findings of fact numbers 36 through 43. Based on those findings of fact, the ALJ had no choice but to dismiss the Protest "insofar as it seeks a determination that exposure to EMFs causes adverse health effects." I.D. at p. 211.

Perhaps OTS, not a party to the proceeding, is not familiar with the extensive amount of evidence submitted in

this case on the issue of whether EMF has been shown to cause adverse health effects. For instance, in this case there was evidence submitted by PECO's witnesses, Drs. Cole, Bockman, Gelmann and Rosenburg, eminent experts in the areas of Epidemiology, Endocrinology, Immunology, Oncology, Molecular Genetics, Cellular Biology, Medicine and Biophysics. This evidence is summarized in the following conclusions of these experts, reached after extensive scientific literature searches and detailed scientific analyses:

Dr. Philip Cole

- Taken together, the epidemiologic reports fail to demonstrate any strong or consistent pattern of association between EMF and cancer among human beings. Indeed, even among the positive studies, findings are not supported by the internal characteristics of the data. The summation can only be that, to date, there is no demonstrated relationship between EMF and cancer in human beings. PECO Reb. St. No. 2, p. 28.

Dr. Richard S. Bockman

- My overall conclusion is that there is no basis to conclude that power frequency electric and/or magnetic fields have adverse effects on the health and function of the endocrine or immune systems. PECO Reb. St. No. 1, p. 27.

Dr. Edward Gelmann

- The extensive research on molecular and cellular biology and cancer provides no scientific basis to conclude that power frequency electric and/or magnetic fields cause, promote, or contribute to the development of cancer of other adverse health effects. This is consistent with the conclusions reached by independent scientific commissions and

agencies that have reviewed this research, such as the American Institute of Biological Sciences, the Virginia Department of Health, the Maryland Department of Natural Resources, and the California Department of Public Health. PECO Reb. St. No. 3, p. 22.

Dr. Murray Rosenbaum

° Based on my knowledge and understanding of biophysics, medicine, and the research publications on power frequency fields, there are very good reasons to believe that exposure to power frequency fields does not cause any significant biological effects, and it is my opinion that exposure to electric and/or magnetic fields from the Woodbourne-Heaton 230 kV line will not result in adverse health effects in humans. PECO Reb. St. No. 4, p. 21.

Further, OTS may not be familiar with the evidence submitted by OCA's witnesses in this proceeding, Dr. Rosenbaum and Mr. Janes, whose testimony can be summarized as follows:

Mr. David E. Janes

° Mr. Janes reviewed the biological literature on EMFs and concluded that: (1) in his opinion, there was sufficient evidence to show that "weak" EMFs do produce subtle "effects on biological systems; (2) the mechanisms producing the effects are not known; (3) effects seen in cells and cellular systems in the laboratory cannot be directly extrapolated to animals or humans; (4) the connection between any biological effects of EMFs and any harm to human health is unclear; (5) but that the possibility of harmful effects could not be summarily or categorically rejected. OCA St. No. 1, p. 10.

Dr. David M. Rosenbaum

° Dr. Rosenbaum reviewed the epidemiologic research of EMFs, concluded that the epidemiology is "far from conclusive" and "very confused," about

potential health effects of EMF and made certain policy recommendation based on his conclusions and the conclusions of Mr. Jones. OCA St. No. 2, pp. 3, 5 and 8.

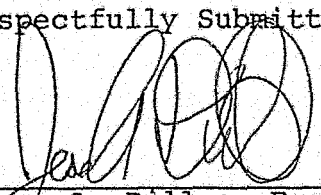
Had the ALJ not made or further limited the questioned findings of fact, the Commission or the appellate courts might have been able to criticize the basis for his decision to dismiss protestant's claims about adverse health effects from EMF. After all, Commonwealth Court remanded this case to the Commission to determine whether the petitioners "will be adversely affected by the reconductoring of the high tension electrical line at issue in this case." Small, et al. v. Pa. P.U.C., No. 761 C.D. 1991 (May 24, 1991). The ALJ's findings of fact are therefore required based on the claims made by the protestants.

For all these reasons, each of the findings of the ALJ is justified based on the extensive body of scientific record evidence in this case which should not be ignored or discounted. Based on this record evidence, no further limitations on the effect of this record evidence in light of "evidence" that OTS alleges will be submitted in a future proceeding would be proper.

III. CONCLUSION

WHEREFORE, for all the foregoing reasons and the reasons explained in PP&L's Exception, the Pennsylvania Public Utility Commission should: 1) deny OTS' contentions relating to findings of fact on EMFs and health effects and affirm the Administrative Law Judge's findings; 2) permit the Woodbourne-Heaton Line to be energized; 3) institute a proceeding which would mandate that all electric utilities in the Commonwealth adopt a comprehensive EMF Policy as explained in PP&L's Exception; and 4) state expressly that line siting applications currently pending and received during the pendency of the regulation or policy statement proceeding on EMF will not be delayed pending the outcome of the EMF proceeding, but will be decided on their individual merits in accordance with present procedures.

Respectfully Submitted,



Jesse A. Dillon, Esquire
Pennsylvania Power & Light Company
Two North Ninth Street
Allentown, Pennsylvania 18101
(215) 774-5013

Dated: September 18, 1992
at Allentown, Pennsylvania

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

LETTER OF NOTIFICATION OF PHILADELPHIA ELECTRIC COMPANY RELATIVE TO RECONDUCTORING AND REBUILDING THE EXISTING LINE TO OPERATE AS A WOOD-BOURNE-HEATON 230 KV LINE IN BUCKS AND MONTGOMERY COUNTIES	:	Docket No. A-110500F055

CERTIFICATE OF SERVICE

I hereby certify that I have this date served a true copy of the foregoing on the following in accordance with the requirements of 52 Pa. Code § 1.54:

VIA FEDERAL EXPRESS

The Honorable Herbert S. Smolen
Administrative Law Judge
Pennsylvania Public Utility Commission
1302 Philadelphia State Office Building
Broad and Spring Garden Streets
Harrisburg, Pennsylvania 19130

Tanya J. McCloskey, Esquire
Dianne E. Dusman, Esquire
Office of Consumer Advocate
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1001 Pennsylvania Avenue, N.W.
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Paul Bonney, Esquire
Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Patricia Krise Burket, Esquire
Law Bureau
Pennsylvania Public Utility Commission
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Harrisburg, Pennsylvania 17105-3265

Jesse A. Dillon
Its Attorney

Dated: September 18, 1992
at Allentown, Pennsylvania

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LAW OFFICES
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JEFFREY A. FRANKLIN

HAROLD J. RYAN (1972)
JOHN S. McCONAGHY (1981)

September 16, 1992

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SEP 18 1992
SECRETARY'S OFFICE
Public Utility Commission

John G. Alford, Secretary
Pennsylvania Public Utility Commission
P.O. Box 3265
Harrisburg, Pennsylvania 17120

Re: Letter of Notification of
Philadelphia Electric Company
Docket No. A-110550F055

Dear Mr. Alford:

Enclosed is a corrected Certificate of Service for the Joint Petition to Intervene which was filed in the above-referenced matter on September 15, 1992.

Please contact me with any questions.

Very truly yours,

RYAN, RUSSELL & McCONAGHY

Jeffrey A. Franklin

DOCUMENT FOLDER

JAF/jlv

Enclosure

cc: Per Certificate of Service

ORIGINAL

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Re: Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as the Woodbourne-Heaton 230 kV Line in Montgomery and Bucks Counties	:	Docket No. A-110550F055

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SEP 18 1992
SECRETARY'S OFFICE
Public Utility Commission

CERTIFICATE OF SERVICE

I hereby certify that I have this date served a true copy of the foregoing on the following in accordance with the requirements of 52 Pa.Code § 1.54:

VIA FEDERAL EXPRESS

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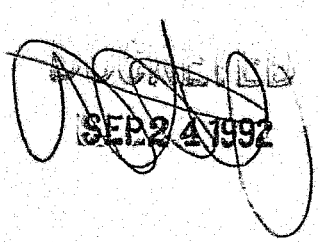
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Dated: September 15, 1992

Jeffrey A. Franklin
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Reading, PA 19603

Attorneys for
Metropolitan Edison Company
and
Pennsylvania Electric Company



ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as a Woodbourne-Heaton 230 kV Line in Montgomery and Bucks Counties	:	Docket No. A-110550, F. 055

RECEIVED
SEP 18 1992
SECRETARY'S OFFICE
Public Utility Commission

DOCKETED
SEP 24 1992

REPLIES OF
PHILADELPHIA ELECTRIC COMPANY

To the Exceptions of
The Office of Consumer Advocate and The Office of Trial Staff

POOR ORIGINAL

DOCUMENT FOLDER

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September 18, 1992

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as a Woodbourne-Heaton 230 kV Line in Montgomery and Bucks Counties	:	Docket No. A-110550, F. 055

REPLIES OF

PHILADELPHIA ELECTRIC COMPANY

To the Exceptions of
The Office of Consumer Advocate and The Office of Trial Staff

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September 18, 1992

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I. Introduction

This case comes before the Commission so that it can determine whether to reaffirm its February 9, 1990 approval to construct and energize the Philadelphia Electric Company ("PECO") 230 kV Woodbourne-Heaton transmission line. As one part of that determination, this proceeding was reopened to take evidence on the sole issue of whether energizing the line will adversely affect certain local residents ("Protestants") sufficient to warrant disapproval of the line.

The Exceptions of the Office of Consumer Advocate ("OCA") and the Office of Trial Staff ("OTS") follow the theme of arguing issues that are simply beyond what the Commission must decide with respect to the line involved in this case. For example, the Office of Consumer Advocate urges the Commission to open a rulemaking proceeding on its Letter of Notification regulations. For its part, the Office of Trial Staff recently made its first appearance in this 3-year old proceeding by filing Exceptions in which the OTS candidly admits that its motivation and arguments are wholly unrelated to this proceeding and relate only to the GPU/Dusquesne transmission line siting proceeding (Docket No. A-110300F051). *See* OTS Exceptions, p. 2, lines 5-10.

It is PECO's position that the Exceptions taken by the OCA and the OTS exhibit a misunderstanding of the issues in this proceeding and the record which was developed in the recent hearings. They are trying to get the Commission to decide issues that would arise in a generic rulemaking proceeding or in another case now pending before the Commission. As explained in PECO's Briefs and

Exceptions, the question here is whether the Woodbourne-Heaton meets the Commission's existing standards for approval of a transmission line -- standards which fully consider potential adverse impacts on health, land use, and the environment, whether those impacts are allegedly caused by electric and/or magnetic fields ("EMF") or by any other aspect of the line. PECO respectfully suggests that the Commission should decide only the issues before it in this proceeding, on the record before it in this proceeding, and promptly reaffirm its approval of this line. Then, the Commission can attend to other issues as it sees fit with a clean slate.

II. Argument

A. The OCA's Letter Of Notification Argument Ignores The Commission's Prior Rulings And, Furthermore, It Simply Does Not Present Any Issues The Commission Must Decide In Determining Whether To Approve THIS Line

In the Introducton to its Exceptions, the Office of Consumer Advocate suggests that "the Commission should initiate a rulemaking to amend its letter notification regulations." OCA Exceptions, p. 3. In the course of its argument, the OCA reiterates its contention that construction of the Woodbourne-Heaton line constituted a "substantial alteration" of the existing right-of-way and that it was therefore inappropriate for PECO to use the Commission's Letter of Notification procedures for this line. *Id.*, p. 2.

First, the question of whether construction of the Woodbourne-Heaton line constituted a "substantial alteration" of the right-of-way already has been finally resolved by the Commission, which found over the strenous objections of the OCA and Protestants that reconstructing and energizing the line would not cause a substantial alteration. *See* March 6 Order, pp. 8-10. *See also* I.D., pp. 186-92. This question was not at issue in these hearings and it is inappropriate for the OCA to continually reargue an issue which it has already lost and on which no evidence was taken in these hearings.

Second, the OCA's request that the Commission initiate a rulemaking proceeding on its Letter of Notification regulations to guarantee that adjacent landowners are heard in transmission line approval proceedings has no application to this case. Protestants just received such a hearing. To the extent that it can be

argued that the Commission's regulations contain any "defect" as to notice or right to be heard, such "defect" has been cured by the instant hearings.

In short, the OCA's "substantial alteration" argument has already been rejected by the Commission and its suggestion of a proceeding to modify the Letter of Notification proceedings simply does not present any issues that the Commission must decide in determining whether to approve this line. PECO suggests that the Commission should recognize that Protestants have already had their hearing and, for the reasons set forth in PECO's Briefs and Exceptions, approve immediate energization of this line.

B. The Technical Exceptions Of The OCA And The OTS Regarding Property Values Do Not Present Any Issues The Commission Must Decide In Determining Whether To Approve THIS Line

Both the OCA and the OTS took a technical Exception to the ALJ's statements regarding property values. While neither the OCA nor the OTS ask the Commission to delay this line based on any claimed property devaluation effect, and while both admit that it is outside the Commission's jurisdiction to determine damages for property devaluation, they nonetheless ask that the Commission should, in some unspecified way, "consider" evidence of property devaluation in determining whether to approve transmission lines. *See* OCA Exceptions, pp. 3-6, OTS Exceptions, pp. 4-7.

There are two reasons that these Exceptions should be ignored or rejected by the Commission. First, the record demonstrates that this line meets the Commission's land use standards even if property devaluation is considered to be a "land use impact." Second, the position that the Commission should consider property values in transmission line approval proceedings puts the Commission in an untenable position.

This record clearly demonstrates that the Woodbourne - Heaton line meets the Commission's land use standards even if property devaluation is considered to be a "land use impact." [1] The Commission's regulations only require that

---

[1] It is necessary at the outset to eliminate any confusion as to whether the Protestants were heard on property valuation issues. They were. The ALJ heard extensive evidence related to the question of property values. *See e.g.* I.D., p. 75-78, 92-93, Protestants' Statement No. 1 (Turner), pp. 3, 5-6, PECO Statement No. 5 (Van Dyke), pp. 13-16, N.T., pp. 104-05, 128-29, 133-34, 137, 238-39, 253-54, 261-62, 281-82, 443-44, 468-69, 491-92, 555, 560-580, 582, 591-92, 606, 612, 677-83, 687, 691-99, 1275, 1276-77,

environmental and land use impacts be minimized, not eliminated. 52 Pa. Code § 57.76(a)(4). In brief, this record demonstrates that:

- The witnesses who testified that energizing the line might cause property devaluation indicated that fear of EMF was the putative cause of such devaluation. *See e.g* N.T. 104 (Koerper), 134 (Lawler), 254 (Harley), 262 (Monarch), 281-82 (Small), 443 (Bianchimano), 468-69 (Fox), 677 (Turner).

- EMF from the line has been minimized; the design used for the line will result in the lowest levels of EMF that could be achieved using technologically available designs. *See* Finding of Fact No. 32, I.D., p. 124.

- Steps were taken that minimize fear of EMF from the line; the "current approach" to minimizing fear of EMF is found in the concept of prudent avoidance, I.D., p. 198, and the line comports with prudent avoidance in its design, use of an existing right-of-way, and levels of EMF. *See* Findings of Fact No. 33, 34, 35 and 55, I.D., pp. 124-25, 129-30, pp. 204-07.

In sum, the ALJ already has made Findings of Fact that EMF and fear of EMF -- the putative causes of property devaluation -- have been minimized. Minimization of such land use impacts is all that is required under the Commission's regulations.

The *West Penn* decision cited by the OTS in its Exceptions (*Re West Penn Power Company*, 68 P.U.C. 262 (1988)), fully supports PECO's analysis that minimization of any "land use impacts" due to property devaluation is sufficient to meet the Commission's standards. In the underlying Initial Decision in *West Penn*, which was adopted by the Commission without change, ALJ Banzhoff resolved the

---

1286-87, 1288-89, 1294, 1296-98.

environmental and land use effects by approving the line because those effects had been minimized:

> " . . . the construction, operation and maintenance of the proposed transmission line will have as little adverse environmental impact as is reasonably possible considering the electrical needs of the public, the state of available technology and available alternatives."

Application of the West Penn Power Company, Initial Decision of ALJ Banzhoff, January 13, 1987, p. 13, *aff'd* by Commission Order, March 5, 1987.

In short, minimization of property valuation impacts -- which in this case was achieved by minimization of EMF and fear of EMF, the putative causes of property devaluation -- is all that is necessary to approve this line. The record evidence in this proceeding demonstrates clearly that such minimization has occurred and that the line should be approved even if the Commission determines that property devaluation should be considered as a "land use impact."

PECO suggests as its second argument, however, that the OCA and the OTS are incorrect in their suggestion that the Commission should consider evidence of property devaluation. This proposal simply creates an untenable situation for the Commission. Are the OCA and the OTS asking the Commission to reach a determination as to whether devaluation has occurred for every property adjacent to a transmission line, regardless of whether a portion of that property was condemned? If there is an allegation that property devaluation is caused by a transmission line, the Pennsylvania courts will have the opportunity to determine whether that allegation is true, and if so, to what extent. Are the OCA and the OTS asking the Commission to essentially duplicate that effort? Issues of efficiency and

judicial economy aside, this puts the Commission at risk of making a factual determination directly at odds with a court's determination, one finding that property devaluation did occur, the other finding that it did not, or one finding a large amount of property devaluation and the other a small amount. Alternatively, are the OCA and the OTS asking the Commission to "consider" property valuation issues on a record that is less well-developed than the courts would use to decide this issue? The types and amount of proof necessary to prove a claim of property devaluation, as well as the legal standards that must be met to prove such a claim, have been carefully developed over the years by the courts and the Commission should not be placed in the position of attempting to resolve whether property devaluation has occurred with less than that type and amount of evidence before it. As yet another alternative, are the OCA and the OTS asking the Commission to "hear and consider" property devaluation evidence without "determining" whether property devaluation in fact has occurred? If so, what is the point of hearing the evidence?

The OTS' cursory reference to the *West Penn* decision does not resolve these questions. Moreover, even a brief review of the history of that proceeding clearly demonstrates that the language quoted by the OTS was *dictum*. The property value issue in *West Penn* was raised by one landowner who specifically did not ask the Commission to consider property values in deciding whether to approve the siting of the West Penn line, either in its siting proceeding, *see* January 13, 1987, Initial Decision on siting, p. 3 ("Mr. Galiachatos stated that he did not object to the

placement of the line . . . he sought to ensure just compensation.), in its determination of whether to approve West Penn's application to exercise eminent domain, *see* June 1, 1988, Initial Decision on eminent domain, p. 4 (". . . we know we cannot stop the power line . . . we want to be compensated . . .), or in the Exceptions filed to those decisions. *See* Commission's 1988 *West Penn* Order, *supra* (setting out landowners Exceptions, all of which are related to quantum of damages rather than a request to consider property devaluation in siting decisions.) In short, in *West Penn* the question of whether, and to what extent, to consider property devaluation evidence in siting proceedings simply was not before the Commission, and its statements are thus *dictum*. Its passing comments in that case should not be taken as the Commission's final word.

PECO submits that the difficult questions posed above do not have an adequate answer. Rather than entering this potentially complicated area, in which the Commission may have to hear conflicting expert testimony on whether property devaluation exists for numerous specific properties, the Commission should simply reaffirm its prior holding in this proceeding -- that with regard to "the issue of depreciation of their [Protestants] property values . . . and that in fact their properties were taken by 'inverse condemnation' . . . these issues are outside the Commission's jurisdiction." March 6 Order, p. 10, n. 9. Protestants already have a forum for their claims of damage to their private interests: such claims are properly within the jurisdiction of the Pennsylvania courts, and they will be compensated in that forum if and to the extent that a cognizable legal claim is

proven. The Commission should limit its consideration to evidence of damage to the public interest in the environment and land use.

In sum, if the Commission determines that it must decide the property devaluation question in this case, it should reconsider its *dictum* in *West Penn* and reaffirm its prior ruling in this proceeding. PECO respectfully submits, however, that in this proceeding the Commission need not decide the question of whether property values are properly considered as a "land use impact" in approving a transmission line -- the record in this proceeding demonstrates that the putative causes of property devaluation have been minimized for the Woodbourne-Heaton line and that it therefore meets the Commission's standards.

C. The OTS' Request For A Limitation On The ALJ's Health And Science Findings Is Academic In This Case

The Office of Trial Staff filed an Exception to passages of the Initial Decision dealing with the EMF science on the grounds that they were not "strictly limited to the evidence adduced in this case." OTS Exceptions, pp. 2-4.

PECO is at a loss as to the point of this academic argument. The Initial Decision contains ample language limiting its findings to this record, and nothing more needs to be done. *See* I.D., pp. 8, 10-11, 134-35. The important point is that the OTS does not challenge the accuracy of the ALJ's findings that the record evidence in this proceeding does not support a conclusion that EMF causes adverse human health effects. *See* I.D., pp. 178-79. Based on that finding, the Commission should approve immediate energization of this line.

D. The OCA's Exception On Prudent Avoidance Supports The View That This Line Should Be Energized

The Office of Consumer Advocate took Exception to the ALJ's recommended finding of fact on prudent avoidance (Finding of Fact No. 49), asking the Commission to clarify that prudent avoidance is a case-by-case approach. *See* OCA Exceptions, pp. 7-9.

PECO agrees that what constitutes prudent avoidance may vary depending on the circumstances of a particular case. In this case, the ALJ found that this line comports with prudent avoidance in its design, use of an existing right-of-way, and field levels. The OCA's Exception thus highlights that there is no reason to delay energizing this line. Prudent avoidance is a case-specific, fact-driven concept, and the fact that this line comports with prudent avoidance has already been determined. [2] PECO therefore submits that the OCA's Exception supports the view that the Woodbourne-Heaton line should be approved and energized immediately.

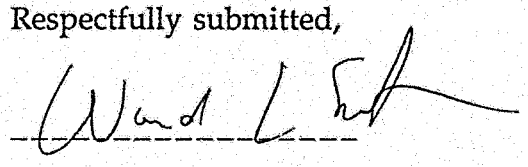
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2 The OCA also excepts to the ALJ's findings of fact on "similarity-based" standards. *See* OCA Exceptions, pp. 7-9. PECO agrees with the OCA that a "similarity-based" standard could not have a health basis. Indeed, as the term "similarity-based" clearly implies, the basis for such a standard must be whether a transmission line has fields that are "similar" to other transmission lines. In this case, the ALJ found that the fields from this line are similar to fields from other transmission lines in Pennsylvania and that the line meets all existing similarity-based standards. *See* Findings of Fact No. 33, 34, 35 and 55, I.D., pp. 124-25, 129-30.

III. Conclusion

For the foregoing reasons, the Commission should reject or disregard the Exceptions of the OCA and the OTS. Moreover, for the reasons set forth in PECO's Briefs and Exceptions, the Commission should reaffirm its prior approval of this line and approve its immediate energization.

Respectfully submitted,



Paul Bonney
Tom Watson
Ward Smith

Counsel for Philadelphia
Electric Company

September 18, 1992

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VIA OVERNIGHT MAIL

Mr. John Alford
Secretary
Pennsylvania Public Utility Commission
North Office Building
North Street and Commonwealth Ave.
Harrisburg, PA 17105-3265

RECEIVED
SEP 1 8 1992
SECRETARY
PUBLIC UTILITY COMMISSION

Re: Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 KV Line to Operate as a Woodbourne-Heaton 230 KV Line in Montgomery and Bucks Counties; Docket No. A-110550,F.055

Dear Mr. Alford:

Enclosed are an original and nine copies of Philadelphia Electric Company's Replies to the Exceptions of the Office of Consumer Advocate and the Office of Trial Staff in the Woodbourne-Heaton proceeding, which are being filed today (September 18, 1992) by Federal Express pursuant to 52 Pa. Code § 1.11(a)(2). Copies have been served on the ALJ and all parties today. In addition, we would like to note that in PECO's Exceptions, page 10, the citation to *Zappavigna v. State of New York* should note that the *Zappavigna* decision is currently on appeal before the New York Supreme Court, Appellate Division, Second Department.

Respectfully yours,

DOCUMENT FOLDER

Ward L. Smith

NVL

cc: (via Overnight Mail)
Hon. Herbert S. Smolen
Robert J. Sugarman, Esquire
Tanya J. McCloskey, Esquire
Patricia Krise Burket, Esquire
Jesse A. Dillon, Esquire

ORIGINAL

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a true copy of the foregoing document upon the parties and in the manner indicated below in accordance with the requirements of 52 Pa. Code § 1.54.

RECEIVED
SEP 1 8 1992
SECRETARY'S OFFICE
Public Utility Commission

By Overnight Mail

The Honorable Herbert S. Smolen
Administrative Law Judge
Pennsylvania Public Utility Commission
1302 Philadelphia State Office Building
Broad and Spring Garden Streets
Philadelphia, PA 19130

Mr. John Alford
Acting Secretary
Pennsylvania Public Utility Commission
North Office Building
North Street and Commonwealth Ave.
Harrisburg, PA 17105-3265

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(Continued)

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Ward L. Smith
Counsel to Philadelphia Electric Co.
Crowell & Moring
1001 Pennsylvania Avenue, N.W.
Washington, D.C. 20004-2505

Dated: September 18, 1992

COMMONWEALTH OF PENNSYLVANIA

RECEIVED
SEP 18 1992
Public Utility Commission
SECRETARY'S BUREAU
Information Control Division

OFFICE OF CONSUMER ADVOCATE
1425 Strawberry Square
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IRWIN A. POPOWSKY
Consumer Advocate

(717) 783-5048

September 18, 1992

John G. Alford, Secretary
PA Public Utility Commission
Room G-23, North Office Bldg.
Harrisburg, PA 17120

DOCUMENT FOLDER

Re: Letter of Notification of
Philadelphia Electric Company
Re: Proposed 230 KV Woodbourne to
Heaton Transmission Line
Docket No. A-110550, F. 055

Dear Secretary Alford:

Enclosed please find for filing an original and nine (9) copies of the Office of Consumer Advocate's Reply Exceptions in the above-captioned proceeding.

Copies have been served upon all parties of record as shown on the attached Certificate of Service.

Sincerely,

Tanya J. McCloskey

Tanya J. McCloskey
Assistant Consumer Advocate

Enclosures
cc: All parties of record

3827MISC

CERTIFICATE OF SERVICE

RECEIVED
SEP 18 1992
Public Utility Commission
Secretary's Bureau
Information Control Division

Re: Letter of Notification of Philadelphia Electric Company Re: Proposed 230 KV Woodbourne to Heaton Transmission Line Docket No. A-110550, F. 055

I hereby certify that I have this day served a true copy of the foregoing document, Office of Consumer Advocate's Reply Exceptions, upon parties of record in this proceeding in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant), in the manner and upon the persons listed below:

Dated this 18th day of September, 1992.

SERVICE IN PERSON

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

LETTER OF NOTIFICATION OF PHILADELPHIA ELECTRIC COMPANY RE: PROPOSED 230 KV WOODBOURNE TO HEATON TRANSMISSION LINE	:	Docket No. A-110550, F. 055

OFFICE OF CONSUMER ADVOCATE'S REPLY EXCEPTIONS

DOCKETED
SEP 24 1992

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I. INTRODUCTION.

On August 19, 1992, the Initial Decision ("I.D.") of Administrative Law Judge Herbert Smolen ("ALJ") was issued. The parties hereto responded by filing Exceptions on September 8, 1992. The Office of Consumer Advocate ("OCA") hereby submits these Reply Exceptions to respond to certain of the Exceptions filed by Philadelphia Electric Company ("PECO" or "the Company"), the Commission's Law Bureau Prosecutory Staff ("Prosecutory Staff"). and Pennsylvania Power and Light ("PP&L").

II. REPLY EXCEPTIONS.

A. The Initial Decision of the ALJ, Which Recommends Temporary Delay in Energization of the Line Pending Adoption and Implementation of EMF Standards, Does Not Constitute A General Statewide "Moratorium" on Transmission Lines.

The ALJ recommends that the Commission order a temporary delay in the energization of the Woodbourne-Heaton transmission line until EMF standards are adopted and implemented and this line is demonstrated to be in compliance therewith. I.D. at 211-212, Paragraph 4. The Company, the Prosecutory Staff and PP&L characterize this Recommended Order as a "moratorium" on all transmission lines. PECO Exceptions at 11-12; Prosecutory Staff Exceptions at 25-27; PP&L Exceptions at 16-18. The OCA submits that this is not an accurate characterization of the recommended order.

First of all, adoption of the recommended order by its own terms would apply only to this line in this case. The Initial

Decision contains no reference to any other line or to any other company. The characterization of an order which could result from adoption of this Initial Decision as a "moratorium" on all transmission lines is overly broad. It must be recognized that not all proposed line rights-of-way traverse residential areas; existing rights-of-way are not always altered in such a manner that protests against proposed lines are filed; not all lines which traverse residential areas run close enough to residences to lead to the filing of protests; and not all potential protestants live near enough to a right-of-way to justify delay of a line for similar reasons. The OCA submits that it will be incumbent upon the Commission to decide any future contested line applications, based upon the facts therein presented.

The OCA submits that an EMF policy to guide company action should be developed and implemented -- but the Commission must decide in each individual case, if protests are filed, whether a particular proposed line should be approved in advance of the implementation of such a policy. Timely Commission action is necessary to formulate responsible utility approaches for meeting public concerns; however, this does not lead inexorably to a conclusion that lines should be delayed in each and every case.

It must be recognized that this case has followed an unusual procedural path, which is unlikely to be repeated. The OCA has argued that the "piecemeal" manner in which this matter has been litigated is not desirable from either a policy or administrative efficiency perspective. OCA Main Brief at 14-18;

Reply Brief at 2-4. In other transmission line cases, it is hoped that notice will have been given to affected property owners before an order is issued by the Commission, and that any Protestants who have concerns about EMF or other environmental or health issues will have an opportunity to raise them in advance of the commencement of construction. Again, whether such concerns would justify a delay or rejection of the line must be decided in those cases.

In its Exceptions, PP&L appears to agree that decisions concerning transmission lines should be made considering a balancing of all of the relevant factors. PP&L Exceptions at 15-16. Clearly, this is difficult to do when evidence is taken as to different facts in different stages of a proceeding. Given the unusual procedural sequence in this case, Protestants have been unable to have their evidence as to the impact of EMF considered in relation to such issues as the need for the line and possible alternative routes. These issues were already deemed to have been decided against the landowners - and could not be balanced or weighed against the adverse effects upon them.

The Commission should reject the characterization of the ALJ's recommendation to delay energization of this transmission line as a "moratorium" on proposed transmission lines in general. The issue is whether the ALJ's recommendation is appropriate in the context of this particular case, where the line was constructed before affected landowners had an opportunity to raise their concerns. The OCA also submits that the Commission should,

however, pursue the ALJ's recommendation that the Commission revise its regulations and act to develop a policy to be followed by electric utilities in attempting to meet the concerns of the public regarding exposure to EMF. Whether decisions on other lines should be defered pending the development of this policy is a matter which will have to be determined in the context of a particular case.

B. The Company's Arguments Ignore The Questionable Validity of the Initial Commission Orders Addressing "Need."

The Company, once again, vehemently argues that the regulations pertaining to transmission lines have been met. PECO Exceptions at 4-7. The OCA submits that this assertion is still subject to debate, due to the unusual procedural course this case has taken. See OCA Main Brief at 14-17; Reply Brief at 4-6. Whether all the standards have been met has not been proven by PECO on the record of this case, despite its assertions that "there can be no argument" that the standards have been met. In fact, PECO itself urged the ALJ not to consider such issues as need and alternative routes in this remand proceeding. PECO Prehearing Memo at 6.

The Company asserts that the Commission's previous orders "clearly establish" that this line is needed. PECO Exceptions at 4-5. The Commission Order of February 1, 1990 was based only upon assertions contained within a single fifteen-page filing by the utility. As later recognized by the Commonwealth Court, that order was entered without prior notice to adjacent landowners who were affected by the utility's planned action. Commonwealth Court Order of May 24, 1991, Docket No. 761 C.D. 1991, at 1. The next order

that the company asserts "clearly establish[es]" the need for the line is that of March 6, 1991. This order was issued in the face of Petitioners' Small, et al., "Emergency Petition to Intervene For Reopening and to Suspend Approval" of the Woodbourne-Heaton line, in which the Petitioners averred that they wished to present evidence on whether the line was needed, among other issues. The May 2, 1992 Order states that it "found public need for the reconstruction of the old Conrail electric line as the Woodbourne-Heaton 230 kV line when it approved PECO's Letter of Notification." Order at 5.

The Company would have the Commission believe that simply reiterating the initial "finding", despite the fact that Protestants were denied their right to be heard on the issue, "clearly establishes" that finding as a fact. This is just not so. A public need for the Woodbourne-Heaton line has never been established through an on-the-record proceeding, with material statements subject to cross-examination by parties clearly affected by the line. What has been established is that affected landowners never had an opportunity to address any of these issues prior to construction of the line.

Other findings of the ALJ belie the utility's assertions that all regulatory standards have been met. The Company asserts that "with regard to safety and health, the Initial Decision clearly establishes that the line will not create an unreasonable risk of danger to safety or health of the public." PECO Exceptions at 5. The Company, however, cites only two findings which support

this assertion, pointing to the statement that the "scientific evidence does not support a conclusion that EMF causes adverse human health effects." Id.; I.D. at 178-179. The OCA submits that this finding does not "clearly establish" that no unreasonable risk of danger to safety or health is created. In fact, the ALJ found as well that the nature and extent of risks to human health posed by exposure to EMFs are uncertain. I.D. at 127, Finding 43. The absence of unreasonable risk to safety and health, therefore, has not been proven by the Company.

With regard to land use, the Company belittles the nature of the Protestants' evidence on this issue, reducing it to "declared self-imposed changes in behavior." PECO Exceptions at 5-6. Similarly, the Prosecutory Staff declares the Protestants' use of their land as somehow not as directly affected by the utility's conduct, as would be the "destruction of the 8th hole green of a golf course because of increased soil erosion from improper grading of a utility access road." Prosecutory Staff Exceptions at 22. The Company and the Prosecutory Staff disregard the many well-supported findings of the ALJ incorporating the record evidence related to changes in land use. I.D. at 131-132. PAUSE witness Turner testified that fear of EMF motivates people to leave their homes, affecting property values and leading to disinvestment.[1]

[1] In its Introduction, PECO provides a summary wherein it states that the ALJ determined the testimony of PAUSE witness Turner was fatally flawed. PECO Exceptions at 1. The ALJ made no such determination. Judge Smolen asserted only that some of PECO's criticisms of witness Turner's testimony "may be correct." I.D. at 196.

I.D. at 180-181, citing Protestants' Statement No. 1 at 5-7; N.T. at 556-561; I.D. at 196-197. Transmission lines certainly affect "land use" and the ALJ found that the Protestants proved this adverse effect in this case.[2] Thus, the minimization of this line's effect on current land use has not been "clearly established", as the Company argues.

In summary, the Company has, in its Exceptions, attempted to "bootstrap" a Commission reaffirmation of its initial order, which is of questionable validity. In this remand proceeding, the Protestants were required to prove whether this line adversely affects them, and they succeeded in doing so. Now, the utility argues that the Protestants have not so proven, and beyond that argues that the meeting of the Commission's requirements as to this line is now "clearly established," as if all issues had been heard in the course of this limited proceeding. Such an argument is misplaced in this remand proceeding.

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[2] Prosecutory Staff, in Reply Exceptions, reiterates the argument that the phrase "land use," as used in the Commission's regulations, encompasses only "direct" environmental impacts. Prosecutory Staff Exceptions at 21-22. Such a narrow interpretation of the term "land use" is inconsistent with its meaning in other contexts, as well as with the Commission's own regulations requiring analysis of the impact upon such factors as landscapes and aesthetics. Impacts upon such factors may not be "direct" in the way in which the Prosecutory Staff argues, i.e. through erosion or contamination. Moreover, Prosecutory Staff also reiterates the argument that because the regulations were passed pursuant to Article I, Section 27 of the Pennsylvania Constitution, they apply only to public land. The examples of "direct" impact on such things as eroded golf course greens and abandoned pasturelands contradict this overly restrictive interpretation of the scope of the Commission's siting regulations.

C. The Finding By the ALJ That The Fears of The Protestants Are Reasonable Is Not Contrary To Law And Is Within The Commission's Jurisdiction to Determine.

1. The ALJ's Finding Is Not Contrary to Applicable Law.

The Prosecutory Staff argues that the ALJ's recommended finding that the Protestant's fears are "reasonable in light of the uncertainty of current scientific evidence" is contrary to Pennsylvania law. Prosecutory Staff Exceptions at 3. As a basis for this assertion, Prosecutory Staff cites many cases, ranging from those based upon emotional distress to unemployment compensation to discrimination to criminal cases. Id., at 3-5. The OCA submits that these cases have no bearing upon this matter, in which the only issue to be decided is whether the Protestants are "adversely affected" by the building of a transmission line on a right-of-way adjacent to their property. Whether Pennsylvania case law requires a person's fear to be reasonable or justified in order to establish liability for personal injury, or to leave employment, or to invoke the fifth amendment privilege is immaterial to a Commission determination of this matter. Herein, fear is relevant to adverse effects upon both people and property values, but is not necessarily determinative of any particular "remedy" or outcome. It is a fact on which evidence was presented, which should be considered with all others, under all of the circumstances, in deciding the proper outcome.

In this case, a burden was imposed upon the Protestants to prove that they would be "adversely affected" by the proposed line. In the course of doing so, the Protestants testified to the

concerns and fears which they experience due to indications that exposure to EMF may cause adverse health effects in human beings. I.D. at 132. The ALJ found this testimony credible and relevant to the issues before him. Id., 196-197.

Whether or not the Protestants' fears are reasonable is a single factor considered by the ALJ in this case, and does not support the Company's alarmist assertions that "the public interest can be held hostage to any intervenor with an imagination and an allegation of concern." PECO Exceptions at 10. In making this argument, the Company appears to ignore the availability of the adjudicative process, which guarantees the parties' right to cross-examine evidence presented by potential protestants, and to present rebuttal evidence. The Company's argument implies a general mistrust of the administrative decision-making process. The OCA submits that utility companies are amply able to defend themselves against "imaginative" intervenors with spurious allegations of concern, and that the public interest, for all of these reasons, is very unlikely to be "held hostage," as asserted by PECO.

Both the Company and the Prosecutory Staff appear to overlook that the Protestants herein were operating pursuant to a unique legal standard imposed by the Commonwealth Court order, and that proving "adverse effects" should not be a routine element in this type of proceeding. Once a standard policy or approach is developed by the Commission, which should require an opportunity for a full hearing before any Commission order, evidence as to concerns of future protestants, whether pertinent to health,

safety, land use or other relevant criteria, will be able to be considered concomitantly with any evidence as to need for and alternatives to such lines.

In addition, the testimony offered by OCA witnesses Janes and Rosenbaum supports the reasonableness and legitimacy of public concerns regarding harm to human health which might result from EMF exposure. I.D. at 110-117; 132. As OCA witness Janes testified:

> Since weak electric and magnetic field effects occur, the possibility of harmful effects cannot be categorically rejected, and concerns about harmful effects are legitimate.

OCA St. 1 at 10. Whether such concerns, which might be similarly expressed by future protestants, should form the basis for delaying or rejecting future proposed lines remains to be seen. The argument by the Prosecutory Staff and the Company on this point should therefore be rejected.

2. The Commission Does Not Lack Jurisdiction to Make Findings of Fact As Argued By the Prosecutory Staff.

The Law Bureau argues that any determination as to the reasonableness of fear of EMF is "outside the authority of and expertise of the Commission and should not be made." Prosecutory Staff Exceptions at 14 - 17. This argument is invalid in that it suggests that it is incumbent upon the General Assembly to specify each and every type or subject of a "finding" which could conceivably be material to the ultimate determination of legal issues by the Commission. This is not feasible.

In the course of performing its statutory duty under the Public Utility Code, the Commission must, through delegation to the

Administrative Law Judge, find facts upon which to base its orders. These facts range from those material to quality of service issues, to the "justness and reasonableness" of rates, to the provision of safe, adequate and reasonable service, and to unreasonableness of preferences or discrimination. Determinations of "reasonableness" in various legal contexts are far from uncommon in this agency's adjudicative processes and often involve extremely complex issues ranging from the prudence of nuclear engineering judgments to the suitability of water for household purposes. The Commission should not refrain from adopting the ALJ's finding in this regard due to the Prosecutory Staff's assertion that it would somehow be outside its jurisdiction to do so.

The OCA would also urge the Commission to disregard some of the speculative comments of the Prosecutory Staff regarding the motives of the Protestants herein. The Staff asserts that "it is clear that one of the primary interests of the Protestants is monetary" and that the Commission should act to "discourage other would-be civil plaintiffs from using this Commission as a cheap forum for discovery or to make a record for use in court." Prosecutory Staff Exceptions, 18-20. These Protestants fought to be able to exercise their due process rights herein; they have raised important public policy issues; and it was not "cheap." The Commission should perform its statutory duty under the Code, without regard to what a potential civil litigant might do later, in another proceeding. The concept that parties to a Commission proceeding may use a record established herein to seek damages in

a civil court is not a novel one. Indeed, the "bifurcation doctrine," under which civil courts require a litigant to pursue claims of inadequate service before the Public Utility Commission before seeking damages in the civil courts, is well-recognized in public utility law. See, e.g., Elkin v. Bell Telephone Co. of Pa., 491 Pa. 123, 420 A.2d 371 (1980).

As such, the OCA would urge the Commission to reject these arguments of the Prosecutory Staff and to recognize that the Commission does have jurisdiction to receive evidence and to make findings of fact relevant to public concerns about these important health and safety issues.

D. The Public Policy Ramifications Expressed By Prosecutory Staff Should Be Considered In a Balanced Context.

At pages 25 to 27 of Prosecutory Staff Exceptions, it is asserted that adoption of the "moratorium" recommended by the ALJ will have dire "public policy" consequences. As discussed above in Section A., the OCA submits that the characterization of the ALJ's recommendation as a moratorium on all transmission lines is inaccurate, and that the recommendation to delay energization, if adopted, should be applied only to the Woodbourne-Heaton line. Future cases should be decided on the facts presented on the record therein.

The Prosecutory Staff asserts that the delay in this line will compromise service reliability, will make it impossible for utilities to fulfill their statutory duty to provide service because they will be unable to extend lines, and would halt construction of lines to commercial and industrial customers,

having a negative economic impact, including increased electric rates. Prosecutory Staff Exceptions at 26-27. This view of the public policy ramifications is one-sided and unsupported by any record evidence. If the Commission were inclined to give weight to such considerations, countervailing policy consideration should also be contemplated. In other words, the Commission must also consider the impacts upon the general public of permitting energization of this line in a residential area when affected residents' concerns which have been found to be valid, were not considered in the order permitting construction. The Commission must also consider the impact upon the general citizenry of the approach of permitting utilities to build new lines in the absence of advance notice to affected parties and regulatory guidance on appropriate EMF policy.

In summary, there is no record support for these many alleged adverse effects upon the electric utilities due to the ruling in this case; therefore, the OCA urges the Commission to reject these assertions in reaching a final resolution of this matter. In the alternative, however, if the Commission chooses to consider them, countervailing policy considerations should also be considered.

E. The Commission Should Adopt the ALJ's Recommendation That Its Transmission Line Siting Regulations Be Amended To Provide Adequate Notice.

The Prosecutory Staff argues that the Commission should reject the suggestion that its regulations be amended to require notice to adjacent landowners where existing rights-of-way are

substantially altered. Prosecutory Staff Exceptions at 32-35. Essentially, Staff argues that it is outside the scope of this proceeding, and that it is too difficult to identify "adjacent landowners," a term undefined by OCA. Id. Prosecutory Staff agrees, however, that some notice is appropriate, stating that it supports the current practice of providing notice by newspaper publication to those who will not receive personal notice.

The OCA submits that the record in this case is inadequate to determine what any revised notice regulations should require. The record herein does, however, amply demonstrate why new regulations are needed and justifies the commencement of a rulemaking proceeding on this issue. Part of the purpose of conducting a proceeding would be to determine whether notice by publication, rather than personal notice, is adequate under the various circumstances in which an electric utility must operate. Another purpose would be to determine how close a person's land must be to an existing or proposed right-of-way to justify a notice requirement, whether personal or constructive in nature. The Prosecutory Staff's argument only makes more clear the need for a proceeding to determine the extent to which either actual or constructive notice to adjacent landowners should be legally required.

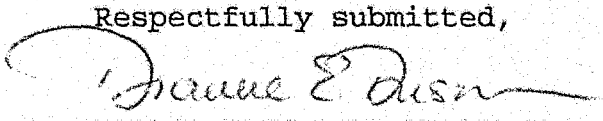
More important, this issue is integral to the adoption and implementation of an approach to establishing a policy for utility conduct in the siting and construction of transmission lines in view of the EMF issue. As OCA witness Rosenbaum stated,

prudent policy in the face of scientific uncertainty as to the nature and extent of EMF effects upon health requires public involvement in the decision-making process in advance of critical decisions being made. OCA St. No. 2 at 7; I.D. at 116-117. The nature and extent of notice to adjacent landowners to be legally required by utility companies planning lines should be considered either in the EMF policy proceeding in the event the Commission adopts the Initial Decision, or, in the alternative, a Commission-ordered proceeding to amend the siting regulations in this manner.

III. CONCLUSION.

For all of the foregoing reasons, the OCA urges the Commission to deny the Exceptions of the Company and the Prosecutory Staff to the Initial Decision of the Administrative Law Judge.

Respectfully submitted,



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Dated: September 18, 1992

COMMONWEALTH OF PENNSYLVANIA
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September 18, 1992

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John G. Alford, Secretary
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Harrisburg, PA 17105-3265

Re: Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as the Woodburne-Heaton 230 kV Line in Montgomery and Bucks Counties.

Docket No. A-110550F055

Dear Secretary Alford:

Enclosed please find an original and nine (9) copies of the Office of Trial Staff's **Reply Exceptions** for filing in the above-captioned proceeding.

Very truly yours,

Charles F. Hoffman

Charles F. Hoffman, Esquire
Chief Prosecutor
Office of Trial Staff

Enclosure

CFH:em

cc: Parties of Record
Office of Special Assistants

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138kV Line to Operate as the Woodbourne-Heaton 230kV Line in Montgomery and Bucks Counties	:	Docket No. A-110550F055

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REPLY EXCEPTIONS OF THE
OFFICE OF TRIAL STAFF

AND NOW, this 18th day of September, 1992, the Office of Trial Staff (OTS) of the Pennsylvania Public Utility Commission (Commission) files the following Reply Exceptions, pursuant to 66 Pa. C.S. §332(h) and 52 Pa. Code §5.535:

I. THE ALJ'S DETERMINATION AS TO THE REASONABLENESS OF CONCERNS AND FEARS REGARDING EMF IS NOT INCONSISTENT WITH PRIOR PENNSYLVANIA CASE LAW ON EMF FEAR

DOCUMENT FOLDER

Law Bureau Prosecutory Staff (Law Bureau) contends, in its Exceptions at pages 1-8, that the ALJ, in effect, committed an error of law by not following Pennsylvania precedent concerning, e.g., the compensability of fear in determining whether or not fear of EMF is reasonable. However, these Pennsylvania cases cited by the Law Bureau are totally inapplicable to the instant situation. These cases concern, generally, the issue of "fear" as a compensable item of damages in personal injury actions, or "fear" as a basis for refusal of employment in unemployment compensation cases, or "fear" as a duress defense in criminal actions. None of these cases

provide proper guidance in the instant situation, wherein the Commission is called upon to determine the appropriate regulatory response to EMF fear which is real, which results directly from the purported normal operation of public utility facilities, and which produces a significant change in lifestyle for those living in close proximity to these facilities.

Moreover, to the best of OTS's knowledge, there is no Pennsylvania precedent concerning the appropriate evidentiary standard to be used in determining the sufficiency of record evidence on EMF fear. Law Bureau's Exception on this point is without merit and should be disregarded.

II. THE COMMISSION HAS THE REQUISITE AUTHORITY TO MAKE THOSE FINDINGS NECESSARY TO SUPPORT CONCLUSIONS REQUIRED TO BE MADE IN THE EXERCISE OF REGULATORY DUTIES

Law Bureau excepts to the ALJ's Finding of Fact No. 69, Initial Decision, page 132 (see Law Bureau Exceptions, p. 17). In that finding of fact, the ALJ concludes that concerns about EMF health effects are reasonable given the scientific uncertainty. Law Bureau contends that any determination about the reasonableness of EMF fear is outside the authority and expertise of the Commission and should not be made. Law Bureau Exceptions, pp. 14-17. Law Bureau is in error.

OTS has previously explained why findings with respect to EMF health effects must be limited to the evidence

adduced in the instant proceeding. See, OTS Exceptions, pp. 2-4. However, given that the finding of "scientific uncertainty" is limited to an assessment of the evidence of record in the instant proceeding, and without passing judgment as to whether or not that evidence should have or should not have been found to be "uncertain", the OTS believes the Commission possesses the requisite authority to make determinations concerning the reasonableness of EMF fear in the course of its regulation of public utility facilities.

In the instant case, the Commonwealth Court Remand Order required the Commission to consider whether Petitioners would be adversely affected by the reconductoring of the high tension electrical line at issue herein. In determining the existence of adverse impacts which necessitated the postponement of line reconductoring, the ALJ was required to make certain findings to substantiate that decision. It was obviously important for the ALJ to distinguish between fears which were imaginary or frivolous and those which were reasonable in determining whether to delay the construction of utility facilities. That is why the finding as to the reasonableness of the fear was made and why it is necessary and proper to this finding to be made in support of the ALJ's decision to delay construction.

Section 501(a) of the Public Utility Code, 66 Pa. C.S. §501(a), provides that the Commission shall have full power and authority and it shall be its duty to enforce,

execute, and carry out the provisions and the full intent of the Public Utility Code. The intent of 66 Pa. C.S. §501 is to give the Commission full power in regulating services and rates. Fairview Water Co. v. Pa. P.U.C., 509 Pa. 384, 502 A.2d 162 (1985). The transmission line in question here is a public utility facility which is sought to be used in the provision of public utility service. Clearly, the Commission possesses the requisite authority and unique expertise to make such findings as are required in the regulation of the placement, design, construction, etc. of public utility facilities. Any contentions to the contrary are in error.

III. THE COMMISSION CLEARLY POSSESSES THE REQUISITE AUTHORITY TO CONSIDER ALL ADVERSE IMPACTS RESULTING FROM A PUBLIC UTILITY'S CONSTRUCTION AND OPERATION OF UTILITY FACILITIES

Law Bureau excepts to the ALJ's determination that the limitation of a property owner's use of property near a transmission line due to fear of EMF health effects constitutes an adverse impact on "land use." See, Law Bureau Exceptions, pp. 20-23. Law Bureau contends that the Commission's consideration of "land use" in transmission line siting applications is limited to consideration of direct environmental impacts (such as the abandonment of pasture land due to spraying of herbicides and pesticides) and does not extend to protection of solely private property interests. In support of its contention, Law Bureau cites Article I, Section 27 of the Commonwealth's Constitution, as interpreted

by Borough of Moosic v. Pa. P.U.C., 59 Pa. Commonwealth Ct. 388, 429 A.2d 1237 (1981).

In Borough of Moosic, supra, the Court reviewed a Commission decision wherein the Commission refused to allow the Borough to present evidence in a public utility land transfer application proceeding as to the alleged detrimental environmental harm to be caused by a non-utility grantee's proposed use of the land. The Borough contended that this refusal to allow it to raise these environmental considerations violated Article I, Section 27 of the Pennsylvania Constitution, which provides for the protection of the Commonwealth's natural resources. The Court disagreed with the Borough and ruled that Section 27 did not enlarge the scope of the Commission's authority so as to permit the agency to oversee the actions of non-utility grantees. Instead, Section 27 required the Commission to consider the direct environmental consequences of a utility's own conduct, as such conduct is within the ambit of the Commission's regulatory authority.

While Section 27, as interpreted by Borough of Moosic, supra, precludes Commission evaluation of the environmental impacts created by non-utility developers, it does not follow from the Borough of Moosic decision that the Commission is somehow limited in its utility siting applications proceedings to a consideration of direct environmental consequences only. The siting regulations

themselves provide for a consideration of other factors such as the need for the transmission line. See, 52 Pa. Code §§57.72(c)(5), 57.75(e)(i). There is simply no compelling reason why evidence in siting proceedings concerning "land use" impacts could not be interpreted to include the changes in use collectively of many private property owners in direct response to the siting of the line.

Even assuming, arguendo, that the term "land use", as found in the Commission's siting regulations at 52 Pa. Code §57.75(e)(3)(i),[1] refers only to direct environmental impacts on land use, the Commission's siting regulations specifically provide for the consideration of other relevant factors by the use of the term "inter alia" in listing the categories of inquiry for hearings held on transmission line siting applications. See, 52 Pa. Code §57.75(e). Thus, the ALJ's consideration of changes in use of private property in proximity to the line, as a direct response to the energizing of the line, is appropriate. The ALJ properly considered these impacts in response to a Commonwealth Court remand order, which required the Commission to consider whether the property owners would be adversely impacted by the energizing of the line.

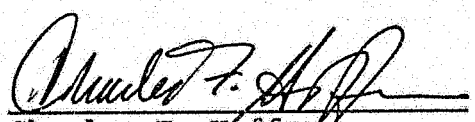
WHEREFORE, for the reasons stated herein, the Office of Trial Staff respectfully requests that the above-mentioned

---

[1] While the Commission's regulations at 52 Pa. Code §57.75 do not generally apply in Letter of Notification proceedings, the Commonwealth Court has, in effect, enlarged the scope of this proceeding to consider adverse impacts on property owners.

exceptions be denied. The lack of response to any other exception should not be interpreted as agreement with that exception. As stated in OTS's Exceptions, OTS's main concern is to protect the viability of positions which may be taken by OTS and other parties in the pending GPU/DQE proceedings at Docket No. A-110300F051.

Respectfully submitted,



Charles F. Hoffman
Chief Prosecutor
Office of Trial Staff

Pa. Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105-3265
(717) 787-4886

Dated: September 18, 1992

CERTIFICATE OF SERVICE

I hereby certify that I am serving the forgoing document, either personally or by first class mail, upon the participants listed below.

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151 West Maple Avenue
Langhorne, PA 19047

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Charles F. Hoffman, Esquire
Chief Prosecutor
Office of Trial Staff

Dated: September 18, 1992

A-110550F055

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ATTORNEYS AT LAW
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ROBERT J. SUGARMAN
ALAN M. KAPLAN
SUSANNE I. GIENDL*

KEVIN M. STACK
LEGAL ASSISTANT
*NOT ADMITTED TO PRACTICE IN PENNSYLVANIA

ORIGINAL

RECEIVED
SEP 23 1992
SECRETARY'S OFFICE
PUBLIC UTILITY COMMISSION

September 24, 1992

Mr. John G. Alford, Secretary
Pennsylvania Public Utility
Commission
Room G-18, North Office Building
Harrisburg, PA 17120

Re: Letter of Notification of Philadelphia Electric Company at Docket No. A-110550F055

Dear Mr. Alford:

Enclosed please find an original and eight copies of Protestants' Answer to Petition to Intervene of Duquesne Light Company et al in the above-referenced matter.

Sincerely,

Robert J. Sugarman

RJS:er
Enclosure
pldngs92\paus-ans.924

ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

IN RE: LETTER OF NOTIFICATION OF PHILADELPHIA ELECTRIC COMPANY UNDER 52 PA CODE § 57.72(d) RE: PROPOSED 230 KV WOODBOURNE TRANSMISSION LINE : DOCKET NO. A-110550-F055

DOCUMENT FOLDER

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SEP2 8 1992
SECRETARY'S OFFICE
Public Utility Commission

DOCKETED
SEP 30 1992

ANSWER TO PETITION TO INTERVENE OF DUQUESNE LIGHT COMPANY ET AL

Protestants oppose the Petition to Intervene on the following grounds:

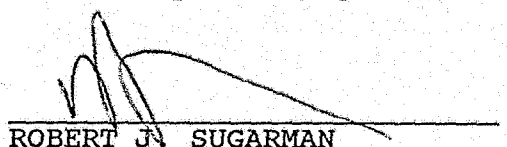
1. The petitioners to intervene have had knowledge of this proceeding no later than April 1991, but have taken no action to intervene, while a record has been made.

2. Petitioners to intervene opposed and successfully opposed the Petition to Intervene of Citizen Protestants in the Commission's proceeding relating to their transaction, by a narrow interpretation of the right to intervene (Docket G900240 et al). It would be inconsistent and unfair for the Commission to treat the proposed intervenors differently than the citizen intervenors in that case.

3. Petitioners' position is adequately represented by two or more of the parties already of record.

4. Petitioners to intervene are dissimulating and contending that "their understanding that the sole issue in the proceeding was the narrow issue of notice". (Petition, paragraph 15). Said statement is so ludicrously false that it suggests malpractice on the part of intervenors' counsel.

5. Denied that the energization of the PECO line could have any significant or adverse affect on the petitioners, as alleged in paragraph 16. The statement is so vague and general as to defeat itself, or to require joinder of all of the utilities using any transmission line, in any transmission line proceeding.



ROBERT J. SUGARMAN
Counsel for Protestants

OF COUNSEL:

SUGARMAN & ASSOCIATES
7TH FLOOR, ROBERT MORRIS BUILDING
100 NORTH 17TH STREET
PHILADELPHIA, PA 19103
(215) 864-2500
pldngs92\paus-ans.924

CERTIFICATE OF SERVICE

I, Robert J. Sugarman, certify that I have mailed a copy of the foregoing Answer to Petition to Intervene by Duquesne Light Company et al by first class mail postage pre-paid to the following:

Paul R. Bonney
Assistant General Counsel
Philadelphia Electric Company
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Philadelphia, PA 19101

Tanya J. McCloskey, Esq.
Asst. Consumer Advocate
Office of Consumer Advocate
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Patricia Krise Burket, Esq.
Penna. Public Utility Commission
G-28, North Office Bldg.
P.O. Box 32265
Harrisburg, PA 17120

The Honorable Herbert S. Smolen
Administrative Law Judge
Pennsylvania Public Utility Commission
1302 Philadelphia State Office Building
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Philadelphia, PA 19130

Tom Watson, Esquire
Ward L. Smith, Esquire
Crowell & Moring
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Washington, D.C. 20004

Jesse A. Dillon, Esquire
Pennsylvania Power & Light Company
2 North Ninth Street
Allentown, PA 18101

W. Edwin Ogden
Alan Michael Seltzer
Ryan, Russell & McConaghy
530 Penn Square Center
P. O. Box 8281
Reading, PA 19603

ROBERT J. SUGARMAN

Dated: 9/24/92

pldngs92\paus-ans.924

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P. O. BOX 3265, HARRISBURG, Pa. 17120

October 5, 1992

IN REPLY PLEASE
REFER TO OUR FILE

RECEIVED
OCT 5 1992
SECRETARY'S OFFICE
Public Utility Commission

John G. Alford
Secretary
Pennsylvania Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105-3265

Re: Letter of Notification of Philadelphia Company Relative to Reconstructing Electric and Rebuilding the Existing 138 kV Line in Montgomery and Bucks Counties.
Docket No. A-110550F055.

Dear Mr. Alford:

Enclosed for filing, please find an original and two copies of the Law Bureau Prosecutory Staff's Answer in Support of Joint Petition to Intervene. A Certificate of Service evidencing service on the parties is attached to the answer.

Sincerely,

RLS

Patricia Krise Burket
Assistant Counsel

Law Bureau Prosecutory Staff

Enclosures

cc: All parties

RECEIVED
OCT 05 1992
Public Utility Commission
SECRETARY'S BUREAU
Information Control Division

ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DOCKETED
OCT 09 1992

Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138kV Line to Operate as the Woodbourne-Heaton 230kV Line in Montgomery and Bucks Counties	:	Docket No. A-110550F055

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OCT 05 1992
Public Utility Commission
SECRETARY'S BUREAU
Information Control Division

DOC

ANSWER IN SUPPORT OF
JOINT PETITION TO INTERVENE

Pursuant to 52 Pa. Code §5.61(a), the Law Bureau Prosecutory Staff files this answer in support of the Joint Petition to Intervene filed on September 16, 1992 by Duquesne Light Company (Duquesne), Metropolitan Edison Company (MetEd), Pennsylvania Electric Company (Penelec), Pennsylvania Power Company (Penn Power), West Penn Power Company (West Penn) and UGI Utilities, Inc. (UGI) (herein after the Joint Petitioners) and states as follows:

1. The Initial Decision issued August 19, 1992 by Judge Herbert Smolen at the above-captioned docket sustained in part the Protest filed by members of the group PAUSE (Parents Against An Unsafe Environment) in regard to energization of the Philadelphia Electric Company's Woodbourne-Heaton 230kV Line. The Initial Decision found, inter alia, that energization of the line would result in adverse land-use impacts by reason of fear of potential adverse human health effects and recommended that energization

of the line be delayed until the Commission sets standards for levels of electromagnetic fields (EMF) at the edge of electric transmission line rights-of-way. The administrative law judge reasoned that the delay in energization of the line until EMF standards are established comports with the concept of prudent avoidance.

2. The Initial Decision thus sets out a number of issues which are properly of concern to the Joint Petitioners and the whole electric utility industry. The Initial Decision, as it stands, constitutes a de facto moratorium on the construction of all transmission lines in the Commonwealth of Pennsylvania until EMF standards are set by the Commission.

3. The ALJ's findings that "fear of EMF's unproven health effects is reasonable" and that a voluntary decision of Protestants not to fully utilize their outdoor property area because of fear of EMF constitutes a "land use" effect are serious misstatements of Pennsylvania law, and could possibly have serious rate consequences for the electric industry and utility ratepayers.

4. The administrative law judge's solution to not energize the line until standards of EMF are set by the Commission, in fact, runs counter to the concept of prudent avoidance, which allows transmission line construction to proceed in the face of uncertainty. As such, the ALJ's

solution similarly has serious reliability of service consequences to all jurisdictional electric utilities, and their ratepayers.

5. The scope of this proceeding as understood by Joint Petitioners, as stated in their petition to intervene, was to be limited to whether the Protestants are adversely affected by the reconstruction of the Conrail line so that they would have been entitled to receive notice of the filing of PECO's letter of notification. The expanded relief afforded to Protestants -- not energizing PECO 230kV line until EMF standards are set by the Commission because of the "reasonable" fear of unknown EMF health effects -- was not envisioned as a likely outcome of this proceeding and excuses Joint Applicants' failure for not intervening earlier.

6. The solution proposed by the Intervenors -- that the Commission issue a tentative order with an opportunity for comment when ruling on exceptions filed to ALJ Smolen's August 19, 1992 decision -- provides a fair and reasonable opportunity for all interested parties to be heard while not prejudicing any rights of the Protestants.

7. The Intervenors' proposed procedure also has merit as a preventative legal measure. Under Pa. R.A.P. §501, "any party who is aggrieved by an appealable order" has standing to appeal a final order of the Commission. Denial of the opportunity for the Intervenors to participate in this

proceeding arguably constitutes an appealable due process issue before Commonwealth Court, which could have been easily remedied at the administrative agency level.

8. Intervention will also allow other interested parties to participate in this proceeding, a result which will assist in the Commission's decision-making process and clearly benefit the public interest.

WHEREFORE, for the foregoing reasons, the Law Bureau Prosecutory Staff supports the invention of Duquesne Light Company, Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, West Penn Power Company and UGI Utilities, Inc., and their proposal that the Commission issue a tentative order on the exceptions filed to ALJ Smolen's August 19, 1992 Initial Decision so as to allow an opportunity for comment on that tentative order.

Respectfully submitted,

Patricia Krise Burket

Patricia Krise Burket
Assistant Counsel

Law Bureau Prosecutory Staff
Pennsylvania Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105-3265
(717) 783-2810

Date: October 5, 1992

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Letter of Notification of Philadelphia Electric Company Relative to Reconstructing and Rebuilding of the Existing 138kV Line to Operate as the Woodbourne-Heaton 230kV Line in Montgomery and Bucks Counties.	:	Docket No. A-110550F055

CERTIFICATE OF SERVICE

I hereby certify that I have this date served a true copy of the foregoing Answer on the following persons in the manner indicated:

By First Class Mail

Robert J. Sugarman, Esq.
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Crowell & Moring
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Pennsylvania Power & Light Company
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Allentown, PA 18101

By Hand Delivery

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Harrisburg, PA 17120

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Assistant Counsel

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Pennsylvania Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105-3265
(717) 783-2810

Date: October 5, 1992

PENNSYLVANIA PUBLIC UTILITY COMMISSION
Uniform Cover and Calendar Sheet

1. REPORT DATE: January 28, 1993	2. BUREAU AGENDA NO. FEB-93-OSA-23*
3. BUREAU: Office of Special Assistants	
4. SECTION(S):	5. PUBLIC MEETING DATE: February 4, 1993
6. APPROVED BY: Director: C. W. Davis 7-1827 Supervisor:	
7. PERSON IN CHARGE: A. Arnold 7-8032	
8. DOCKET NO.: A-110550, F.055	

DOCKETED
FEB 22 1991

9. (a) CAPTION (abbreviate if more than 4 lines)
(b) Short summary of history & facts, documents & briefs
(c) Recommendation

(a) Letter Notification of Philadelphia Electric Company Relative to Reconductoring and Rebuilding of the Existing 138 kv line to operate as a Woodbourne-Heaton 230 kv Line in Montgomery and Bucks Counties.

(b) On November 27, 1989, Philadelphia Electric Company ("PECO") filed a Letter Notification pursuant to 52 Pa. Code §57.72(d)(1) proposing to reconductor and reconstruct a former 138 kv transmission line previously owned by Consolidated Rail Corporation as the Woodbourne -Heaton 230 kv transmission line. On September 14, 1990, certain property owners who live along the corridor filed an Emergency Petition alleging, inter alia, that they did not receive notice, were entitled to notice and requested that the proceeding be reopened so that they could raise issues of zoning, diminution of property values and adverse health effects from electromagnetic fields ("EMF"). The Commission denied the request and the Commonwealth Court, in a Memorandum Opinion ordered a remand on the question of whether the Petitioners will be adversely affected by the line. On August 12, 1992 Administrative Law Judge Smolen issued his Initial Decision ("I.D."). The Initial Decision recommends that the line not be energized pending the Commission's consideration of EMF standards.

(c) The Office of Special Assistants recommends that the Commission adopt the attached Opinion and Order which directs a remand limited solely to consideration of a study entitled "Magnetic Fields and Cancer in People Residing Near Swedish High Voltage Power Lines", ("The Swedish Study").

10. MOTION BY: Commissioner Holland — Commissioner Rhodes - Yes
Commissioner
Commissioner

SECONDED: Commissioner Chm. Rolka
Commissioner
Commissioner

CONTENT OF MOTION: Postponement to Public Meeting of March 11, 1993 for the Commission's further consideration.

NVL

DOCUMENT FOLDER

ORIGINAL

FAX COMMUNICATOR
717-787-5813
2 sheets

PLEASE DELIVER TO: Commissioner David Rolka

Commissioner David Rolka
Public Utility Commission
P.O. Box 3265
Harrisburg, Pa. 17120

RECEIVED
FEB 11 1993
SECRETARY'S OFFICE
Public Utility Commission

February 14, 1993

A-110550 F0055

Subject: PECO Woodbourne 230,000 Volt Transmission Lines
Reference: Proposed PUC/PECO March 11th, 1993 Hearing

RECEIVED
FEB 19 1993
SECRETARY'S OFFICE
Public Utility Commission

Dear Commissioner Rhodes;

It is our understanding that on March 11th, PECO will be before the Public Utility Commission to request an appeal of Judge Smolen's decision on the Woodbourne Transmission Line. As you are aware, Judge Smolen ruled that the Woodbourne lines would not be energized until safety standard guidelines were adapted by the Public Utility Commission.

We want to reinforce and strongly agree with the judges original writings and decisions regarding this case. Almost daily, you see that many of the states are requiring stricter laws and standards relative to electromagnetic fields and high power transmission line placement to homes, schools, businesses and public places.

From various information that we have gathered, it seems apparent that states are requiring a minimum distance of 500 ft. to 1000 ft. - <u>THE FURTHER THE BETTER.</u>

We have attached an article dated February 12th from our local paper regarding some new findings relative to electromagnetic fields and sell damage to genes.

We hope that the PUC stands by Judge Smolen's decision not to activate the Woodbourne Lines and sets safe standards to their placement.

Sincerely,
William J Harley
Barbara Harley

NVL

cc: Commissioner David Rolka
cc: Commissioner Wendel Holland
cc: Judge Herbert Smolen

William & Barbara Harley
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Huntingdon Valley, Pa.
19006-1304
Phone: 215-355-2989

DOCUMENT FOLDER

DOCKETED
MAR 02 1993

New genetic clues to leukemia susceptibility found

The Associated Press
WASHINGTON

A genetic defect may allow cells to take off on a wild growth spurt that leads eventually to adult leukemia, say researchers. The finding holds the promise of a test for leukemia risk.

Dr. Cheryl L. Willman of the University of New Mexico School of Medicine reports today in the journal Science that it may take the loss of only half of the normal pair of IRF-1 genes to start a process that leads to leukemia.

She said in an interview that a missing or malfunctioning IRF-1 gene was found in the cells of each of 13 patients who had adult leukemia or a condition called myelodysplasia that leads to leukemia.

"Our hypothesis is that if you lose a single allele (half of a pair of genes) it can lead to unrestrained cell growth," she said. Rapidly dividing cells cause a higher rate of mutation and "can cause a promotion to full blown leukemia," said Willman.

The IRF-1 gene, located on chromosome 5, causes cells to secrete a protein that regulates cell division. It represses the action of a protein that is expressed by another gene, called IRF-2, that promotes cell division. IRF stands for interferon regulatory factor.

A companion paper in Science by scientists at the Osaka University in Japan reports that tumors quickly develop in laboratory mice if there is a surplus of the IRF-2 protein or a shortage of the IRF-1 protein. In effect, the study found that if the two proteins are out of balance, then cancers can form.

Willman said it appears that a balance of the two proteins is lost if only one of the two IRF-1 genes is missing, damaged or malfunctioning.

She said her studies show that a single IRF-1 gene is deleted in patients with myelodysplasia, a condition that appears for some years in older adults before they develop leukemia.

"We think that their whole myelodysplasia may start with the loss of a single allele," said Willman. "They then progress on in time to develop full blown leukemia."

She said there are other genes or biological actions involved in the process that eventually tips a person over into full blown leukemia, but those processes are not understood.

The researcher said that the IRF-1 gene is located in a region of chromosome 5 that is known to be very sensitive to environmental effects.

Exposure to such agents as chemicals and radiation, said Willman, may cause IRF-1 and other genes on chromosome 5 to break, perhaps starting the cascade of biological events that leads to leukemia.

Willman said her team now is developing a test that would identify adults who are at increased risk of developing leukemia.

Uncle turns in man in Sudafed case