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DATE OF DOCUMENT  
10-15-76

TO: Mr Regan

FROM: Pa Pwr & Light Co  
Allentown, Pa  
N W Curtis

DATE RECEIVED 10-18-76

LETTER  
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DESCRIPTION

Ltr re our 10-6-76 ltr.....trans the following:

PLANT NAME: Susquehanna 1 & 2

ENCLOSURE

Responses to NRC request for addl info on transmission lines..... w/atatch drawings & legal contracts....

(1 cy encl rec'd)

~~DO NOT REMOVE~~

*See Drawings jacket*

SAFETY		FOR ACTION/INFORMATION		ENVIRO	
ASSIGNED AD:	<i>Vassallo</i>	ASSIGNED AD:	<i>V. Moore</i>	11-19-76	ehf
BRANCH CHIEF:	<i>Parr</i>	BRANCH CHIEF:	<i>Regan</i>		
PROJECT MANAGER:	<i>Miner</i>	PROJECT MANAGER:	<i>Bajwa</i>		
LIC. ASST.:	<i>Rushbrook</i>	LIC. ASST.:	<i>Duncan</i>		

INTERNAL DISTRIBUTION			
<input checked="" type="checkbox"/> REG FILE	SYSTEMS SAFETY	PLANT SYSTEMS	SITE SAFETY & ENVIRO ANALYSIS
<input checked="" type="checkbox"/> NRC PDR	HEINEMAN	TEDESCO	DENTON & MULLER
<input checked="" type="checkbox"/> I & E (2)	SCHROEDER	BENAROYA	
<input checked="" type="checkbox"/> OELD		LAINAS	
GOSSICK & STAFF	ENGINEERING	IPPOLITO	ENVIRO TECH.
MIPC	MACCARRY	KIRKWOOD	ERNST
CASE	KNIGHT		BALLARD
HANAUER	SIHWEIL	OPERATING REACTORS	SPANGLER
HARLESS	PAWLICKI	STELLO	
PROJECT MANAGEMENT	REACTOR SAFETY	OPERATING TECH.	SITE TECH.
BOYD	ROSS	EISENHUT	GAMMILL
P. COLLINS	NOVAK	SHAO	STEPP
HOUSTON	ROSZTOCZY	BAER	HULMAN
PETERSON	CHECK	BUTLER	SITE ANALYSIS
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HEITEMES	AT & I		BUNCH
SKOVHOLT	SALTZMAN		J. COLLINS
	RUTBERG		KREGER

EXTERNAL DISTRIBUTION			CONTROL NUMBER
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<input checked="" type="checkbox"/> TIC:	<input checked="" type="checkbox"/> REG. VII	<input checked="" type="checkbox"/> ULRIKSON (ORNL)	
<input checked="" type="checkbox"/> NSIC:	<input checked="" type="checkbox"/> LA PDR		
<input checked="" type="checkbox"/> ASLB:	<input checked="" type="checkbox"/> CONSULTANTS		
<input checked="" type="checkbox"/> ACRS CYS HOLDING/SENT			

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PP&L

TWO NORTH NINTH STREET, ALLENTOWN, PA. 18101

PHONE: (215) 821-5151

Bicentennial  
Pennsylvania



So your children can tell  
their children.

October 15, 1976

REGULATORY DOCKET FILE COPY

Division of Reactor Licensing  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Docket Nos. 50-387  
50-388

ATTENTION: Mr. William H. Regan, Jr., Chief  
Environmental Projects Branch #3

SUSQUEHANNA STEAM ELECTRIC STATION  
AMENDMENT NO. 5 QUESTIONS & RESPONSES  
ER 100450 FILE 991-2  
PLA-138

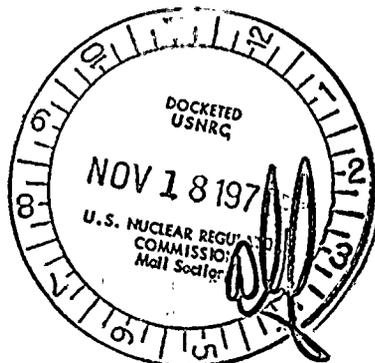
Dear Mr. Regan:

In response to your letter dated October 6, 1976 which requested additional information on Susquehanna Steam Electric Station transmission lines, the Pennsylvania Power & Light Co. has attached responses to the nine questions.

Very truly yours,

N. W. Curtis  
Vice President-Engineering & Construction

JSF:AAW



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SUSQUEHANNA AMENDMENT NO. 5  
QUESTIONS AND RESPONSES  
OCTOBER 15, 1976

Question 1 - Table 3-9A2, Right-of-Way Data

Explain the basis for designing a maximum 500 KV right-of-way width of 200 ft.

Response 1

The right-of-way width determination of a transmission line requires review of the following structural and electrical radiation factors:

- o Structural - conductor blowout
- o Electrical radiation

Radio noise  
Electrostatic induction

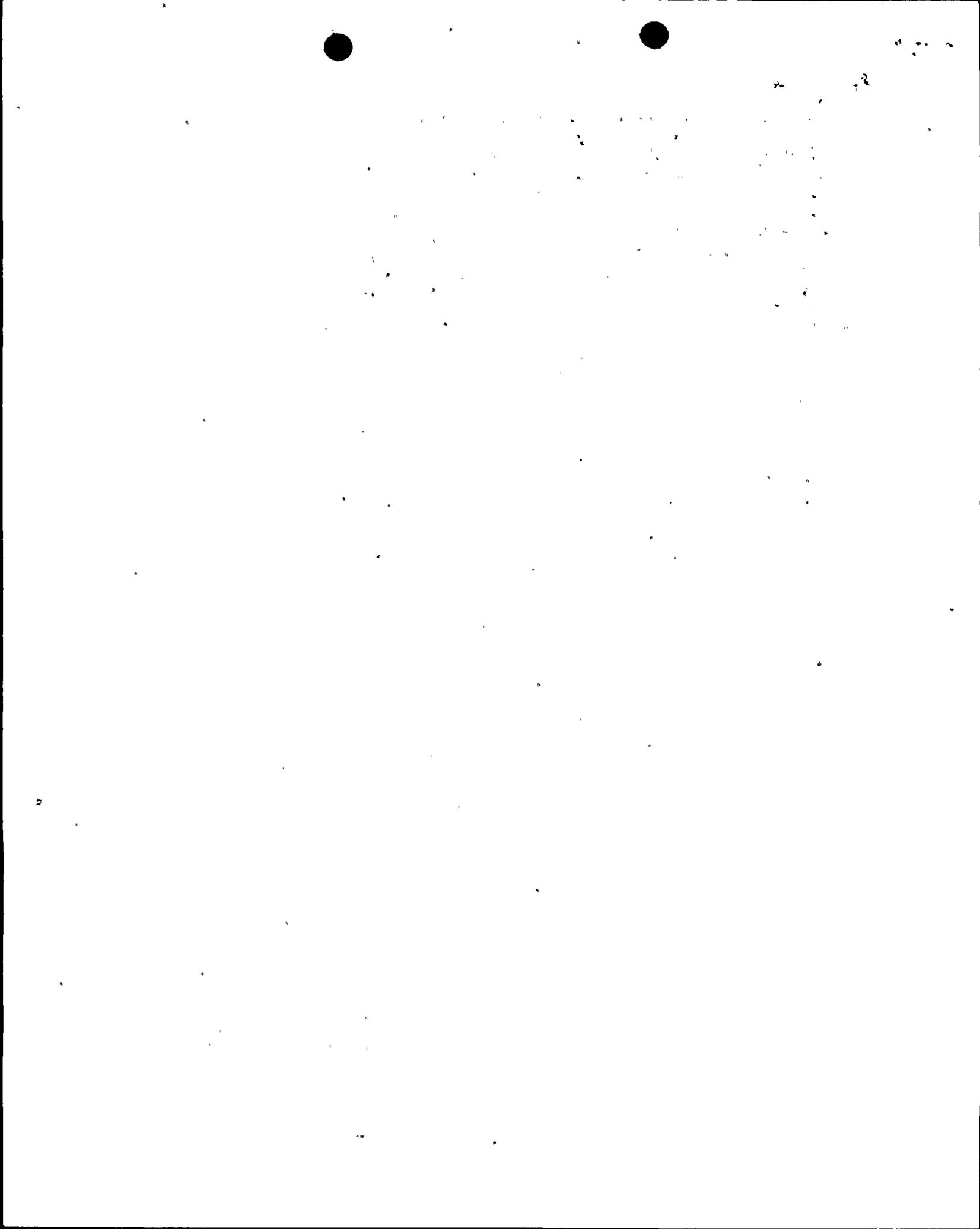
All these factors must be considered and the right-of-way width determined from an analysis of each.

Structural - Conductor Blowout

The conductor blowout criteria applied by PP&L Co. is that the conductor when subjected to a 60 MPH wind will blow to within 15 ft. of the edge of the right-of-way. The blowout is a function of the conductor design tension, maximum conductor ice and wind loading and span length. The right-of-way width is determined before the structures are spotted so it is selected for the maximum anticipated span on the line. Experience gained through years of line design or a preliminary layout on a profile developed from USGS maps is used to develop the maximum span. For the conductor design tensions of a 500 KV line, a 1,900 ft. span is used as the maximum. The right-of-way width required to meet this span length is 200 ft. In the final design stage, spans exceeding this maximum are reviewed and clearances determined and a judgement made as to the purchase of additional right-of-way.

Electrical Radiation

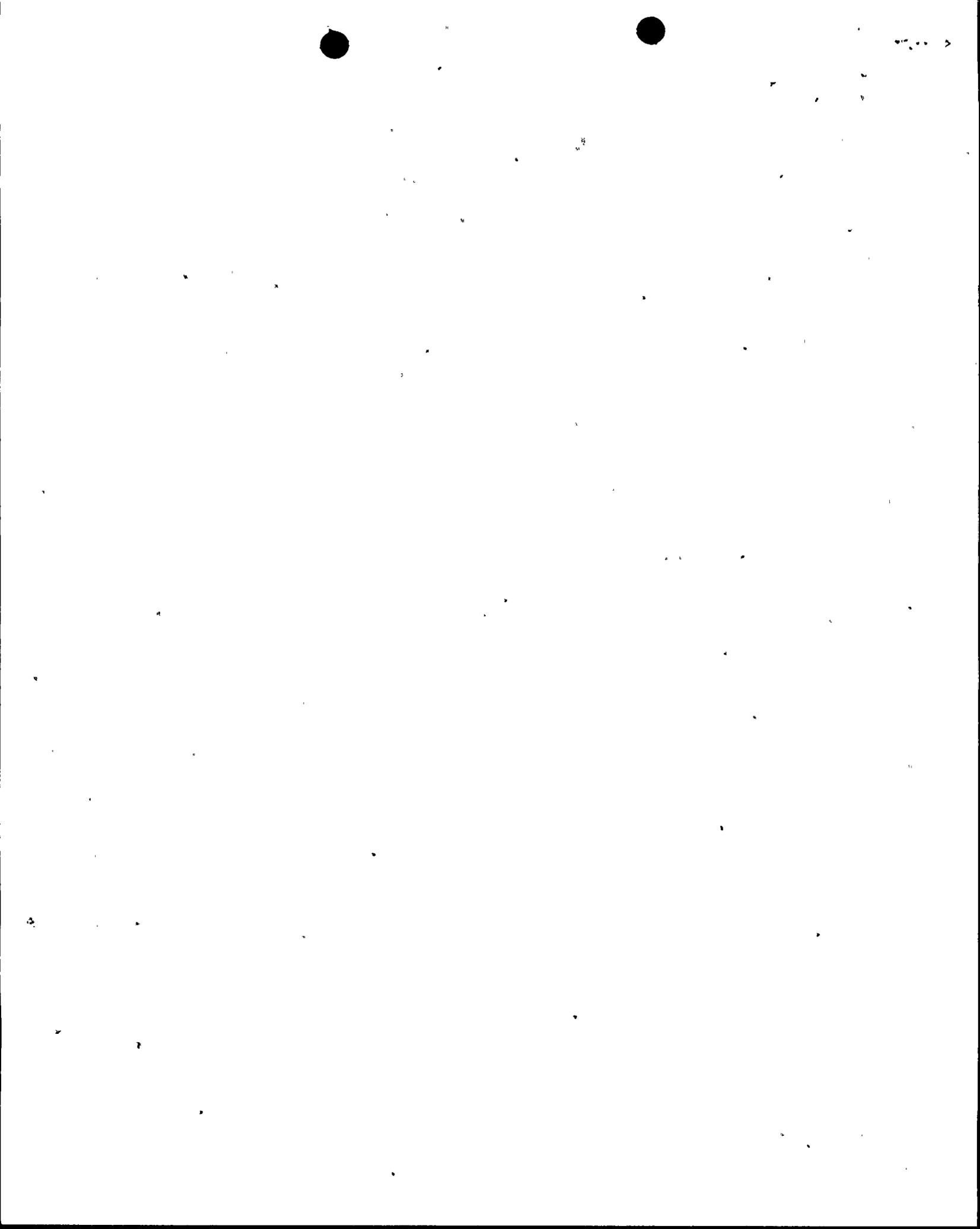
- o Radio noise (RI): The first 500 KV line on the PP&L system was constructed during the mid-1960's. During the design phase for this line, a survey of radio reception quality along the proposed line centerline was made. This data was used as input to the conductor selection program to determine a conductor design that would give the same RI 50 ft. outside the edge of the 500 KV right-of-way which could be expected at the right-of-way edge of existing 230 KV lines. A 2493 KCMIL ACAR conductor was selected as the



Response 1 - Cont'd.

economical conductor when an annual cost analysis considering first cost and  $I^2R$  losses was completed. This conductor resulted in RI of 42.7 dB (A) (fair weather) and 64.7 dB (A) (heavy rain) at 150 ft. from the centerline. For a 230 KV line at its right-of-way edge, the RI is 42 dB (A) (fair weather) and 64 dB (A) (heavy rain). Based on the selection criteria for RI, the 500 KV design meets the requirements and a resulting right-of-way width of 200 ft. is adequate. This width has been used as a standard width since then. A right-of-way width of 300 ft. was rejected since the additional 12 acres of right-of-way required per mile was not justified from a land use standpoint since a receiving antenna is not anticipated within 150 ft. of the line centerline at many locations throughout the line length. When a problem in reception does exist, PP&L's policy is to investigate and correct reception problems. If the line traverses a heavily populated area and RI is determined to be a problem, a change in conductor design or right-of-way width is investigated to determine the cost benefit of making the change or of providing remote antennas.

- o Electrostatic induction: PP&L bases the right-of-way width for electrostatic induction on an electric field gradient of less than 2 KV/m. At this gradient level, there is no hazard of fuel ignition while refueling vehicles off the right-of-way. The gradient of the 500 KV line at 100 ft. from the centerline is 1.6 KV/m.



Question 2 - Section 3.9.3.4.a, Forest Cover

Determine the likelihood of existence of any threatened or endangered floral species specified by the Department of Interior for Pennsylvania along the proposed rights-of-way by contact with State liaison representatives or specialists.

Response 2

The U.S. Department of Interior has proposed a list of threatened and endangered floral species for the U.S. in the Federal Register of June 16, 1976, Part IV (pp. 24524-24572). Five endangered species have been listed for Pennsylvania and they are as follows:

1. Cerastium arvense
2. Isotria medeoloides
3. Trollius laxus
4. Scirpus ancistrochaetus
5. Elodea schweinitzii

Dr. Louis V. Mingrone Professor of Biology at Bloomsburg State College was contacted to review the transmission routes to determine the impact of the line on these endangered flora. Attached is Dr. Mingrone's response indicating the chance of encountering any of these endangered species is rare.



The page contains extremely faint and illegible text, likely due to low contrast or poor scan quality. No specific words or phrases can be discerned.



BLOOMSBURG STATE COLLEGE

Bloomsburg, Pennsylvania 17815

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OCT 15 1976

SUSQUEHANNA PROJ.

DEPARTMENT OF BIOLOGY

October 14, 1976

PP&L

Two North Ninth St.  
Allentown, PA. 18101

Gentlemen:

This report represents the opinion of Dr. Louis V. Mingrone, Professor of Biology, Bloomsburg State College, Bloomsburg, Pennsylvania.

I have been requested to evaluate the proposed routes of the transmission lines from the Susquehanna Steam Electric Station (Susquehanna SES), Nuclear Power Plant located in the Beach Haven Area, northeast of Berwick, Pennsylvania; southwest to the Sunbury Sub-station, located southwest of Sunbury, Pennsylvania, (designated as the Sunbury-Susquehanna 500 k V Line), and southeast to the Siegfried Sub-station, southeast as Laurys Station, Pennsylvania, (designated as the Susquehanna-Siegfried 500 kV Line).

This report is by no means an endorsement of Nuclear Power Plants, as I will comment neither for nor against such an installation. My report will deal with the proposed routes of the transmission lines only, and to the extent that the construction does indeed follow that stipulated in the document; Susquehanna Steam Electric Station, Applicant's Environmental Report, revised July 1972, Amendment No. 5, July 1976, Pennsylvania Power and Light Company, Allentown, Pennsylvania.

The report will endorse the proposed routes, based upon my Botanical and Ecological observations, as well as reading the Applicants Environmental Report. Pennsylvania Power and Light Company has presented a conscientious effort to study, plan and in the near future, implement construction that will protect the environment from drastic or destructive activities, and yet service this area with the electrical power needed for the existing population and that of the future.

I will comment on the routes of the transmission lines, the ecological impact, the concern for rare or endangered species, as well as the aesthetic nature of these proposed lines.

#### Routes of the Proposed Transmission Lines

The routes selected in a Botanists-Ecologists view seem to be the most logical. In the applicant's proposal, the Sunbury-Susquehanna 500 k V Line will parallel an existing 230 k V Line thereby eliminating a number of problems that might be encountered. This route therefore, appears to be the most economical and will have the least effect on the environment as very little disturbance of the

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area will take place.

The other line proposed, Susquehanna-Siegfried 500 k V Line, does not follow for the most of its length, any pre-existing line; therefore, there will be by necessity, a great deal of new construction. However, the applicant's proposal demonstrates that indeed PP&L has made an exerted effort to traverse areas that are not highly populated, avoided towns and cities, as well as industrial sites, and according to the proposal, will not be laying waste vast areas of landscape by clear-cutting the total length of the right of way. The design, construction, aesthetic nature, and methods incorporated in the applicant's proposal demonstrate a conscientious effort toward the protection of the overall environment.

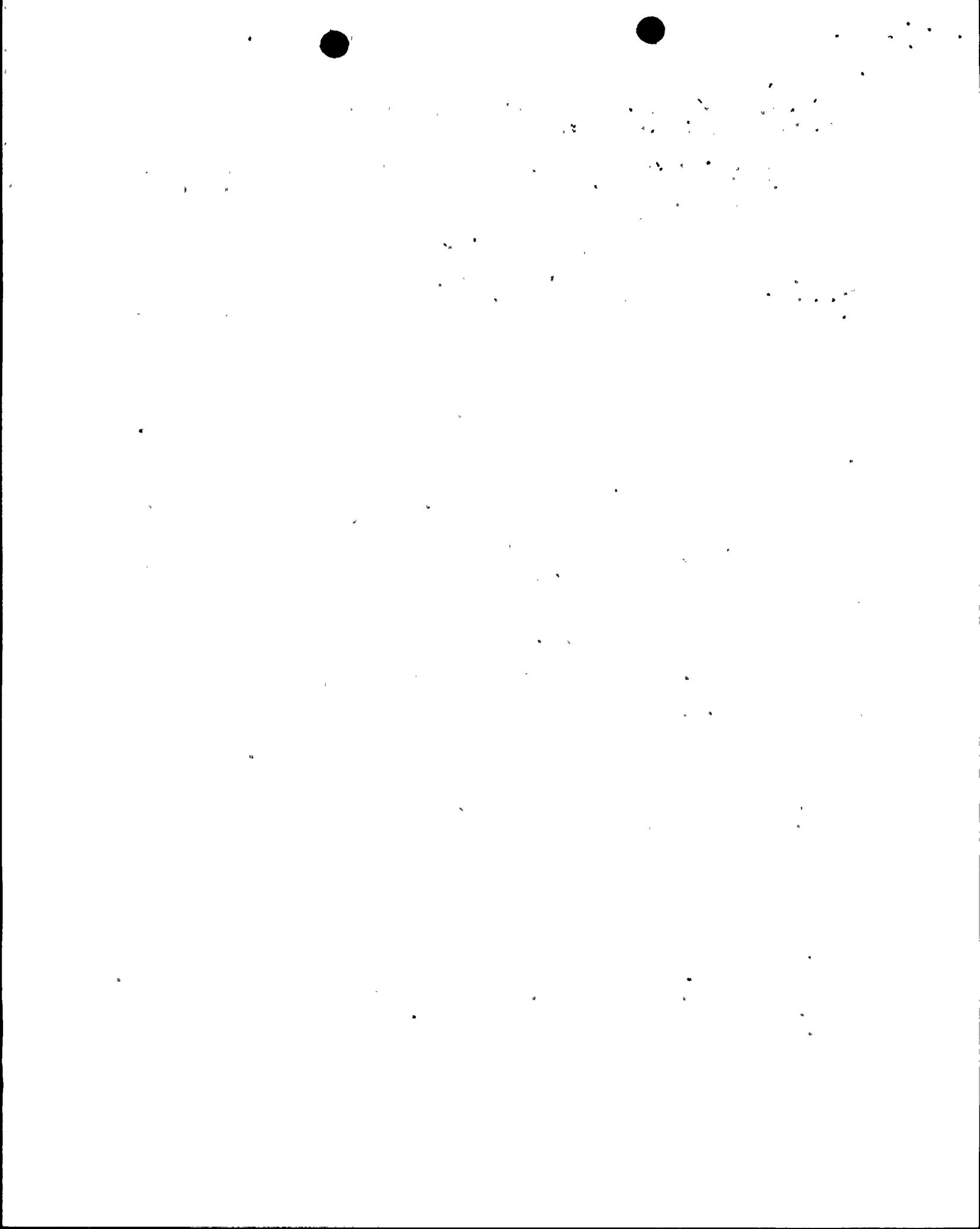
#### Ecological Impact

The areas transversed by the proposed transmission lines will travel through what has been considered unique in the United States, because of the uniformity of the vegetation. I have found, through years of investigation in this area of Pennsylvania that will be utilized for the proposed transmission lines, that indeed there is a tremendous uniformity, not only as to species, but also to the age.

There exists very few virgin areas, let alone extremely old vegetative areas. Historically, these areas have been cut, and recut to provide lumber for railroads, mining, construction, etc. This total area can and is considered by most Ecologists and Botanists, a Mixed Mesophytic Association, with the climax vegetation being classically called Chestnut-Oak. However, since the early thirties, the Chestnut (Castanea dentata (Marsh.) Borkh.) has been extensively destroyed by the Chestnut-bark disease, and replaced by Hickorys or Maples, with seedling or sapling Chestnuts being frequently found. Therefore, what exists here today is a Mixture of a Climax vegetation of Oak-Hickory in that for the most part the predominant species are Oak and Hickory, replacing the Chestnut as a predominant species. In varying degrees Maples will also predominate with the Oaks, in certain areas. The Chestnut as a predominant species, has been lost to the association, except as seedlings or saplings, as well as to the Vegetation of the Northern Hemisphere. The species recognized as the indicator of the vast, uniform Mixed Mesophytic Association is the Tulip Popular (Liriodendron tulipifera L.) which can, with no difficulty, be found and recognized in the total area.

With this type of Vegetation Association, the underbrush or understory vegetation takes on many forms, depending on the overall age and development of the predominant vegetation, as well as the direction of slope, altitude, water availability, and soil composition. Though these variable conditions seem to complicate the picture, in actuality it clarifies the opinion of most ecologists. That the general area is unique in its general habit, but not unique in the species present. I have found that if a particular area has been lost to industrial, commercial, or residential buildings, an area with the same overall characteristics can indeed be found with little or no difficulty; with this accomplished, the same species will most likely also be present. Therefore, the uniqueness of uniformity does indeed make its impact.

As development by man continues in this area, there will be certain portions of our natural area destroyed but there is little need for alarm, as very little will be lost let alone lost forever. The fact being, that an area almost exactly like that which was lost can be found in this vast area of the Northeast. Also, opening the vegetation by development is not always detrimental, because new mini-environments are formed allowing for more diversified and variable islands in this uniform vegetation.



Though some trees will have to be removed, their loss does not demonstrate a drastic change in the area traversed.

The understory vegetation although somewhat variable from area to area, will as the forest itself, has many times recovered it will in turn recover from the type of construction involved in placing the transmission lines.

#### Rare or Endangered Species

It is the general opinion of this writer that there are few actually endangered species of plants in Pennsylvania. There are species that are found more rarely than others and some that are only found in specific localities. Through the years, a great deal of development and construction has occurred, this activity has resulted in the loss of particular or local specific habitats rather than the loss of the species themselves.

Those plants that have a typical distribution through this area can easily be found. However, those species of plants that either have a limited distribution or isolated distribution would of course be considered rare. But the species in the areas being considered are not of this latter type, but are found commonly throughout the area. In fact, the areas traversed by the proposed lines will in my opinion not be found to have any really endangered or rare species of plants.

In the Federal Register of June 16, 1976, Part IV, the U.S. Department of Interior Fish and Wildlife Service has proposed a list of Endangered and Threatened Species-Plants (pp. 24524-24572), there are listed five species of plants for Pennsylvania.

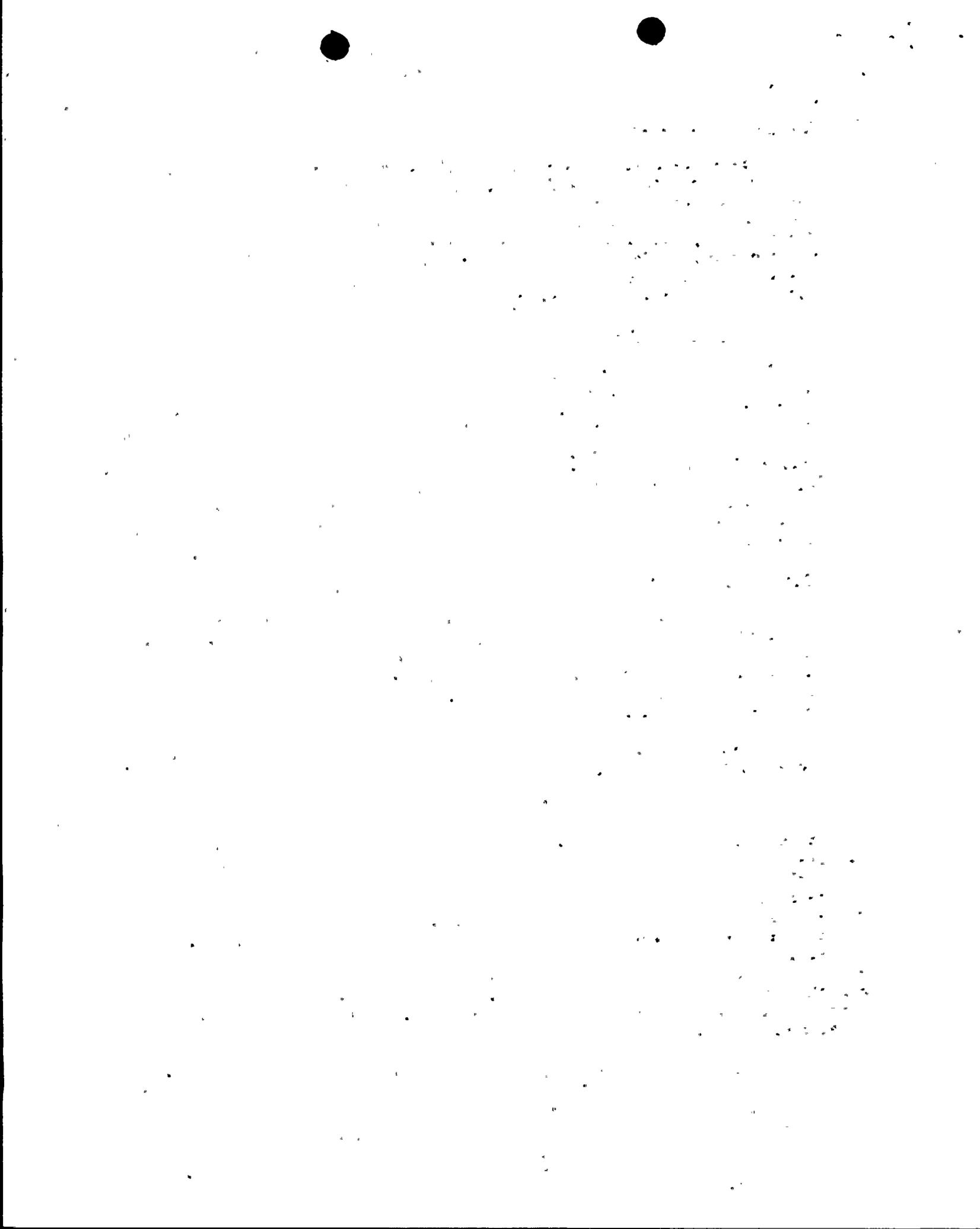
#### Species Listed

1. Cerastium arvense var. villosissimum Pennsell

This particular variety is found only on Serpentine-barrens, Chester, PA. The typical variety has a distribution from Labrador to Alaska, south to Newfoundland, Prince Edward Island, New Brunswick, New England south to Delaware, Maryland, Wisconsin, South Dakota, New Mexico and California. Other varieties of the species have a similar distribution as the typical variety. Therefore, since this one variety has one known locality it can be considered rare and in fact endangered, but the proposed transmission lines will not be in Chester County, PA.

2. Isotria medeoloides (Pursh.) Rof.

This species is found, very rarely, in local and small colonies distributed from New Hampshire and Vermont south to North Carolina, and in southeast Missouri. This species has always been listed as rare throughout its range, because of its habit of growing in small colonies that are widely dispersed. This, along with the general habit of the species of being quite small could account for it not being found very often. Nevertheless, this species is rare throughout its range and the chance of destroying colonies of this species are just as rare as finding the species.



3. Trollius laxus Salisb

This species is found in rich meadows and swamps, rare or local, western Connecticut to Michigan, south to Pennsylvania; by old records of collections north to western New Hampshire and western Maine. From the distribution of this species, it can be seen that it barely gets into Pennsylvania, and probably northern Pennsylvania at its extreme southern distribution. I feel this species also will not be encountered by the transmission line construction, as the type of habitat is just not present throughout the proposed construction areas.

4. Scirpus ancistrochaetus

This particular species, if it does exist, I find no record of it in Gray's Manual of Botany, eighth ed., Merritt Lyndon Fernald, corrected Printing 1970, Van Nostrand Reinhold Company. This particular reference has through its many revisions and editions has actually been considered the authoritative reference for Northeastern United States and Adjacent Canada, for over 100 years. Therefore, the plant referred to in the Federal Register may not exist as an actual species, but be a miss named specimen or if this species does exist in Pennsylvania, it is so rare or so newly found the actual chances of it being found in the area of the transmission lines is scant.

5. Elodea schweinitzii

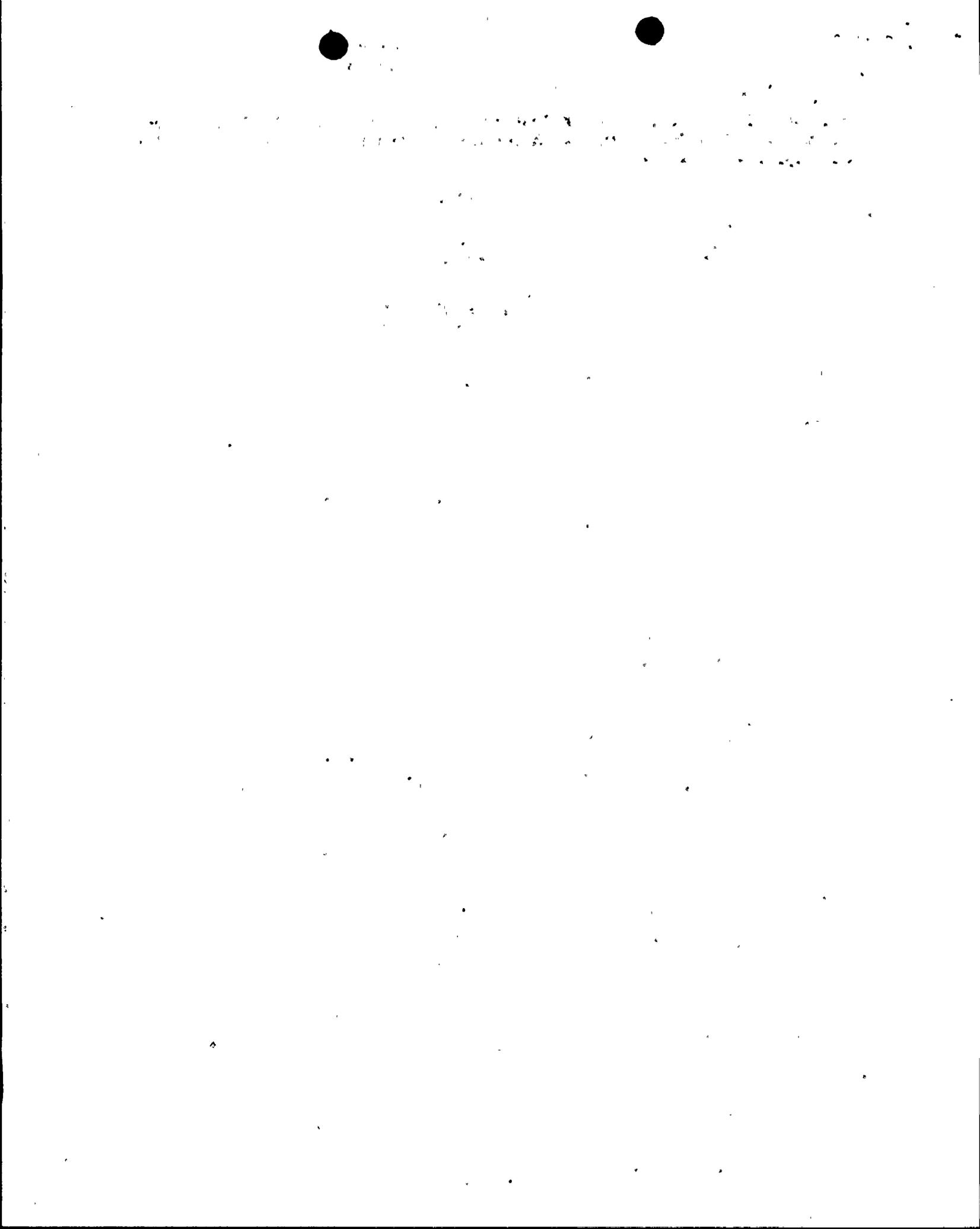
This species is also like the above species (#4) in fact the Federal Register has this species asterisked suggesting anyone knowing of a location for it to submit such information. I find no record of this species throughout our area and I wonder if indeed enough information about the said species is available or do we have an incomplete specimen which has no location information with it in the Smithsonian.

I do believe that these proposed lines will neither encounter nor destroy any endangered or rare species.

Aesthetic Appearance

The type of structures for support of the proposed transmission lines have been planned to be maintenance free, and to visually blend in with the surrounding cover. In this portion of the report I feel compelled to comment, as I believe if PP&L had suggested or even anticipated massive clear-cutting strips of land the length of the proposed transmission lines, I would have been greatly offended, not only as a Botanist, but also as a resident of this area and would have openly opposed this proposal. There is nothing more strikingly horrendous than a large swipe through the landscape for transmission lines of any kind. This type of construction, I hope, is gone forever and the total ecological and environmental impact is not fully known to this day, except that it is indeed visually revolting.

The design, construction and planning to keep the environment as nearly unchanged as possible in the PP&L proposed are clearly evident of the concern to comply with all environmental protection regulations. I therefore find that PP&L has indeed done its homework, in its considerations of placing the transmission lines, because for a great deal of the length the lines nor supports will be visible. I therefore find I must support this proposal because of its completeness



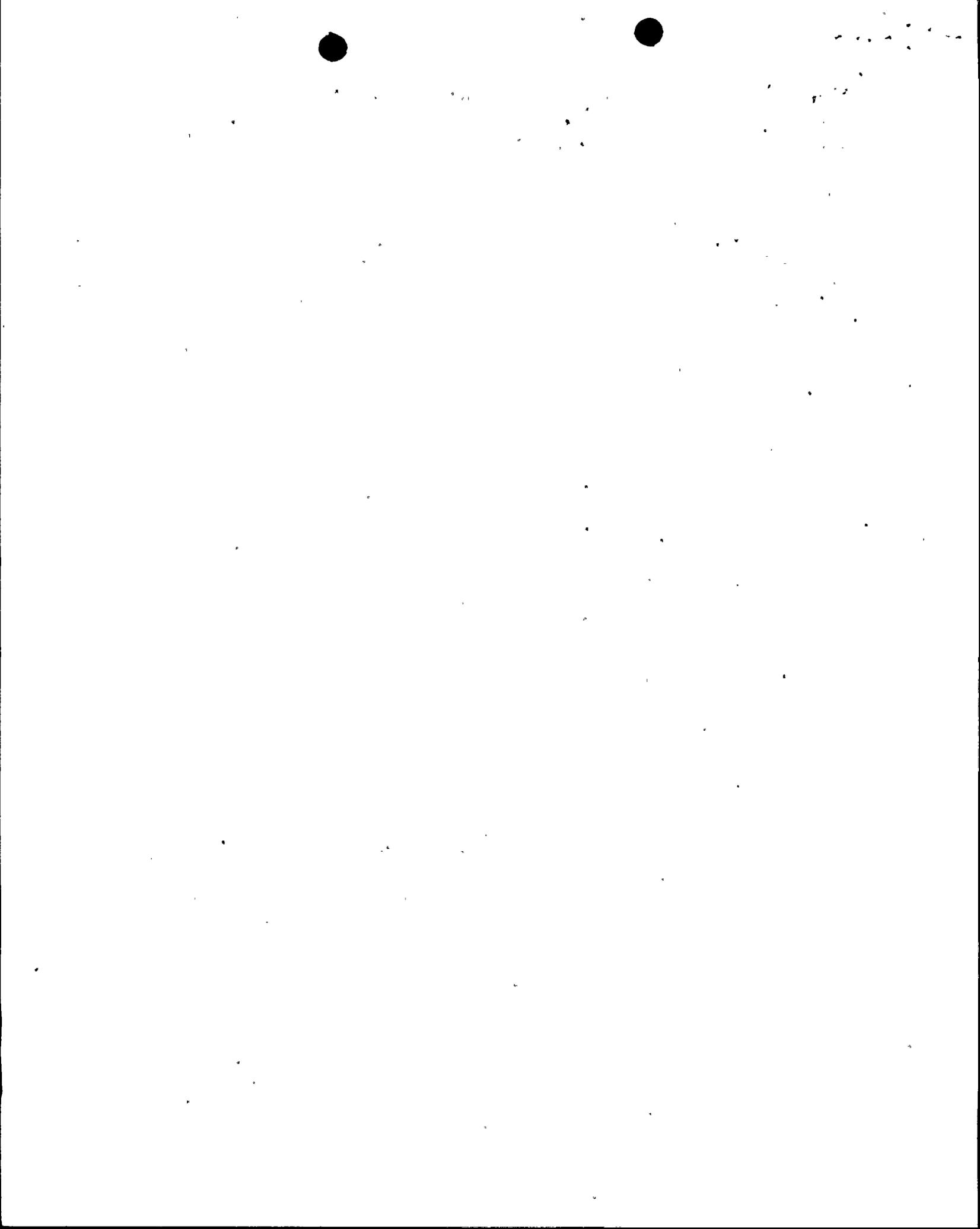
and overall concern for the environment. I feel that this will indeed be an example of living jointly with the environment rather than conquering it and laying it to waste.

Sincerely,

*Louis V. Mingrone*

Dr. Louis V. Mingrone  
Professor of Biology

LVM:sab



Question 3 - Section 4.2.2.4.b and .c, Terrestrial and Aquatic Communities

Specify why "selective cutting" methods have been selected for these areas rather than "tailored cutting".

Response 3

"The term "selective clearing" as used in 4.2.2.4.b and .c, is not the same as defined in PP&L's Vegetation Management Specifications. In fact, "tailored clearing", as defined in those specs., applies here. Generally speaking, "selective clearing" is the normal method of clearing to provide a lower structure silhouette and to minimize construction and recurring maintenance costs. "Tailored clearing" is generally provided at improved road crossings and hilltops visible to the public.

Question 4 - Section 4.2.4.3, Mitigative Measures

Provide documentation for the statement that the Pennsylvania Department of Environmental Resources "has reviewed and concurred" with the crossing location at Lehigh River Gorge.

Response 4

We have received assurances that the Department of Environmental Resources has received and is acting on our application for the river crossing. We will notify you upon receipt of the letter from the DER. We expect to receive this letter by December 1, 1976.

Question 5 - Section 5.5.4.2(b), Visual Effects

Specify what areas of "near view" and "distance view" will be tailored cut rather than selective cut.

Response 5

Tailored clearing will be performed at all improved road crossings, "near view", and at all hilltops which fall into the "long view" category. This is sometimes referred to as "feathering the hilltop" to avoid the notched effect often created when crossing ridges.

Question 6 - Section 10.9.3.1(c), State Game Land

Locate Nescopeck State Park and Crestwood Industrial Park and clarify how selection of Route A avoids these areas.

Response 6

Attached is a USGS map including Nescopeck State Park and the Crestwood Industrial Park.

