Large Filing Separator Sheet

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Description of Document: Transcript w/Exhibits the body, whereas power lines are always emitting magnetic fields.

The second report issued in 2005, which appeared in the *British Medical Journal*, investigated whether the distance between a child's home address at birth and a transmission line was associated with childhood cancer. The report concluded that "there is an association between childhood leukemia and proximity of home address at birth to high voltage power lines, and the apparent risk extends to a greater distance than would have been expected from previous studies." However, this was a very cautious finding, and the report noted that "there is no accepted biological mechanism to explain the epidemiological results; indeed, the relation may be due to chance or confounding."

If the transmission lines were the cause of the cancer, the findings indicated that "1% of childhood leukemia in England and Wales would be attributable to these lines, though this estimate has considerable statistical uncertainty." Commentary published in the same journal observed that in 2002, more than 200 children in England and Wales were killed in road accidents and another 32 died in house fires. In contrast, even if EMF causes childhood leukemia, the result would be an increase of five cases annually.

In the United States, for children age four and under, the national incidence of leukemia is six cases per 100,000 each year. This decreases to about two cases per 100,000 annually for children ten and older. In Virginia, the rate is lower. JLARC staff obtained data from the Virginia Cancer Registry for the most recent five years (Table 12). Staff at the Registry caution that these data are conservative because not all hospitals, outpatient facilities, and private pathology laboratories report cases, and cancer data for areas primarily in Southwest Virginia may be under-reported.

The most recently available data from VDH indicate that ten children under age 20 died from leukemia in 2004, the same number that died from accidental poisoning. In contrast, 150 children died

Table 12: Childhood (Age 19 and Under) Leukemias Diagnosed in Virginia, 1999 - 2003

Year	Rate per 100,000	Number of Persons
1999	3.4	66
2000	4.0	78
2001	3.0	58
2002	3.3	65
2003	3.9	77

Source: Virginia Cancer Registry, September 2006.

of motor vehicle accidents, 50 died as a result of assault by firearms, and 26 died by accidental drowning. There are also more deaths attributed to diseases other than leukemia: 21 children died of heart disease, 17 died as a result of respiratory disease, and 15 died from septicemia.

Magnetic fields have been classified as "possibly carcinogenic" by the International Agency for Research on Cancer, an agency of WHO. This assignment needs to be placed in context, however, because the classification is the lowest—and, as WHO points out, the "weakest"—of the three categories.

The highest classification, carcinogenic to humans, includes asbestos and tobacco. The middle classification, probably carcinogenic to humans, includes agents such as diesel engine exhaust and sun lamps. EMF is classified in the lowest tier, possibly carcinogenic to humans, along with welding fumes and coffee.

The published studies also indicate that there is an association between the strength of the magnetic field and the risk of developing leukemia. The reports point to a magnetic field of 3 mG (0.3 μT) as a dividing line, below which there is no association with the risk of leukemia. However, magnetic fields of 3 mG or more appear to be relatively common, and Table 13 presents data on EMF readings conducted by JLARC staff. As those observations indicate, the level of the magnetic field can vary from one side of the right-of-way to another. (Magnetic fields also vary with current, which varies from hour-to-hour and day-to-day.) Appendix F presents information on magnetic field readings taken along two transmission line rights-of-way.

Although undergrounding has been suggested as a means of reducing exposure to EMF, it appears that there is a substantial differ-

Table 13: Magnetic Field Levels Observed by JLARC Staff

Object Producing Magnetic Field	Observed Level (mG)
Retail Cash Register	1.5, 1.8, 4.4
Underground Distribution Line	4.5 – 12.3
Laptop Computer (Power On)	8 – 20
Same Laptop Computer (Power Off)	1
Car Console Between Front Seats (Power On)	9.4
Same Car (Power Off)	0.6
Sewing Machine (Power On)	11 – 121
Same Sewing Machine (Power Off)	0.4

Note: Reported values were recorded at the closest proximity to the measured object, except for the distribution line, for which a range of ambient values is reported.

Source: JLARC staff measurements, taken with Teslatronics Model 70 Triaxial milliGaussmeter, provided and calibrated by Dominion Virginia Power.

ence in the magnetic field generated by HPFF and XLPE cables. As indicated in Table 11, the types of cables used by Dominion (HPFF) produce magnetic field readings that are very low. However, there are indications that XLPE cables have higher magnetic field readings, and that these readings can be higher than those of overhead lines.

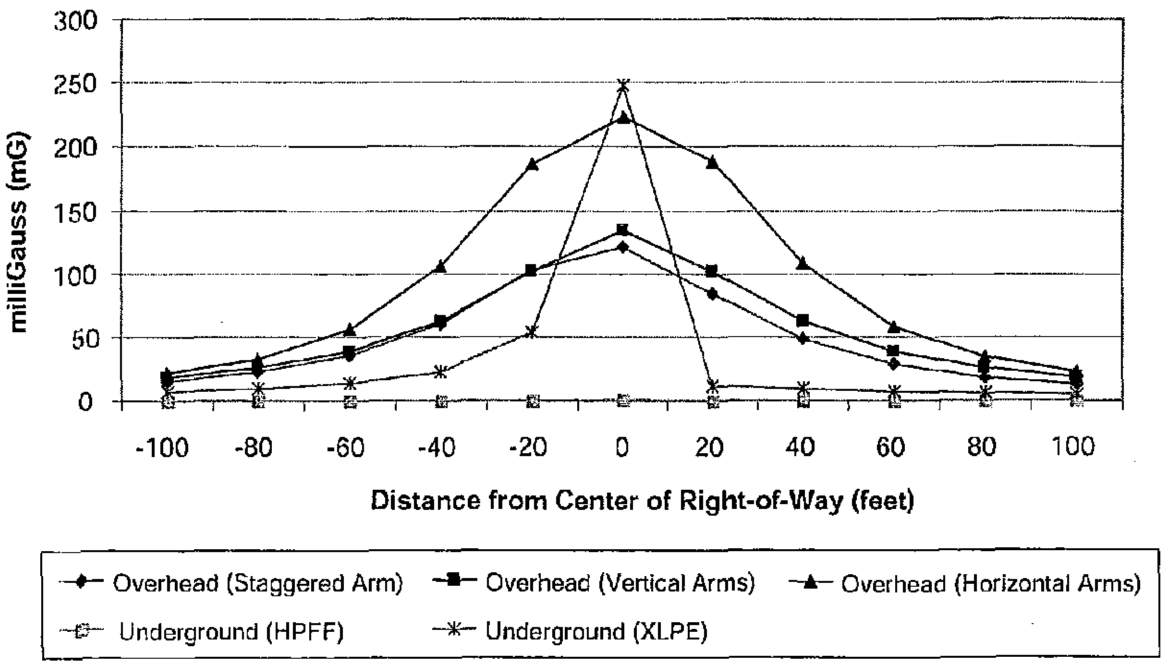
Information on the estimated magnetic field strength of different types of underground cables was presented to the Virginia Joint Commission on Technology and Science (JCOTS). In 2005 testimony, a presenter provided JCOTS with a graph that illustrated the magnetic field strength of overhead lines, XLPE cables, and HPFF cables. At the center of the right-of-way, the magnetic field strength of overhead wires was approximately 165 mG, the XLPE cable was about 145 mG, and the HPFF was about 2 mG. (These estimates were made assuming a load of 700 Amps.) Dominion provided JLARC staff with estimated magnetic field levels for different types of overhead and underground lines (Figure 11). These data also indicate that HPFF has negligible magnetic field readings, but Dominion's data indicate that XLPE has a higher magnetic field than any overhead line.

The differences in magnetic field levels are especially important to consider if the transmission line will be installed in a manner such that the right-of-way will be used by pedestrians. The underground lines currently installed in Virginia are placed underneath sidewalks or in roadways: places where the magnetic field is in close proximity to the surface. Some advocates of undergrounding have also suggested that they be placed underneath recreational trails. If XLPE does generally produce higher magnetic fields than HPFF cables or overhead wires, then its placement near pedestrians could be a concern.

Commissioners Have Not Required Undergrounding as a Means of Addressing Health Concerns

In past transmission line cases, the commissioners have consistently determined that the evidence does not indicate that EMF from proposed lines will threaten human health or safety. As reported in a 1986 opinion approving a 500 kV line in Fairfax and Prince William Counties, the hearing examiner assigned to the case concluded that "there is not sufficient evidence which would give rise to a concern that the health and safety of Virginia residents is imperiled" (1985-00013 and 1985-00020). As a result, undergrounding has not been required. Based on the final orders issued by the commission, none of the ten underground lines approved by the commissioners since 1972 were intended to minimize exposure to EMF.

Figure 11: Magnetic Field Levels Vary Depending On the Type of Overhead or Underground Line Used



Note: Levels are based on 400 megavolt amperes.

Source: Dominion.

The SCC has approached the scientific debate surrounding a possible association between EMF and cancer by relying on literature reviews compiled by VDH and evidence presented during case proceedings. In most of the 12 cases in which the commissioners explicitly discussed EMF concerns, the final orders stated only that the utility had found no evidence that the proposed line would pose a hazard to human health. In other cases, the commissioners addressed issues that had emerged during the public hearings. In at least four of the 76 cases since 1972, the commissioners have concluded that high-voltage transmission lines pose no known health risks to humans. (This conclusion was also reached in seven of the 23 cases involving the connection of a generator or other facility.)

- In a 1991 opinion approving a new 230 kV line through Fairfax and Prince William Counties, the commissioners addressed concerns among homeowners that EMF was dangerous. The commissioners rejected these concerns, noting that scientific studies and EMF estimates presented by Dominion had not been challenged and that some residents moved into the area after construction of the existing transmission line (1989-00057).

- In 1994, the commissioners noted that while epidemiological studies are the best source of information currently available, *these studies are subject to "inherent limitations."* Epidemiological research, they reasoned, is not an experimental science but is based on observation and reviews of health records. As a result, the cause of a disease cannot be proven experimentally but must be inferred (1992-00058).
- In a 2004 order, the commissioners concluded: "Based on the facts presented in this case, we find that the claims of EMF impacts were refuted by evidence presented by the Company" (2004-00062).

The commissioners have also rejected a recommendation to establish standards for maximum allowable electric fields. The commissioners agreed with a finding by the hearing examiner that "there is not sufficient evidence which would give rise to a concern that the health and safety of Virginia residents is imperiled by the proposed high voltage transmission lines" (1985-00013 / 1985-00020). At least six other states (Florida, Minnesota, Montana, New Jersey, New York, and Oregon) have set standards for the electric fields on transmission line rights-of-way, and four states have standards for edge-of-right-of-way magnetic field levels:

- Connecticut: 100 mG
- Florida: 150 mG (230 kV); 200 mG (500 kV)
- Massachusetts: 85 mG
- New York: 200 mG

However, the commissioners have indicated that some of the other measures they employ to reduce environmental impact, such as routing a line away from homes, also serve to reduce any potential EMF effects.

SCC Has Taken Other Steps to Minimize the Potential Effects of EMF

While the commissioners have ruled that current scientific research does not identify EMF as a health threat, they appear to have determined that the possibility of health effects can justify route or design changes to minimize potential impacts on residential developments. In a 1994 opinion approving a 500 kV line extending across the southern part of Virginia, the commissioners noted that, in light of the scientific uncertainties surrounding EMF,

> Some scientists, therefore, advocate taking all steps in the design, location and construction of transmission lines to

> avoid exposing people to magnetic fields. This approach is frequently referred to as "prudent avoidance." While the Commission is not now adopting prudent avoidance as a policy, we note that our approach to routing this particular 500 kV line incorporates many elements which reduce extended exposure of humans to the line (1992-00058).

The commission then added that their "policy of avoiding homes also minimizes the impact on residences from magnetic fields associated with transmission lines." Consistent with this approach, in at least three cases since 1972 the commissioners have cited the health and safety concerns of nearby homeowners to explain route or design changes (1988-00004, 1989-00057, and 1994-00022).

EMF Concerns in Connecticut Recently Led to Legislation Requiring Undergrounding

In Connecticut, proposed transmission lines are reviewed by the Connecticut Siting Council. The council has used the policy of prudent avoidance since 1993, and has recently adopted a threshold of 100 mG at the edge of the right-of-way as an indicator that transmission lines will receive increased regulatory attention. In reviewing new lines, the council adheres to Public Act 04-246, adopted in 2004, which requires that transmission lines of 345 kV or greater should be buried when the lines are located "adjacent to residential areas, private or public schools, licensed child day care facilities, and licensed youth camps or public playgrounds."

As a result of this legislation, overhead lines cannot be placed next to these facilities. However, overhead lines are permissible if an applicant can demonstrate to the council that it is technologically infeasible to bury the line. The definition of feasibility includes consideration of the effect that the underground line could have on the reliability of the transmission system. Similar legislation was introduced this year in Vermont, but it did not become law.

In Virginia, several transmission lines are located in close proximity to schools. GIS analysis performed by JLARC staff indicates that 72 schools are within 500 feet of a transmission line (115 kV and above), including 48 elementary schools. A partial explanation for this may be that EMF concerns did not receive much attention until the 1980s, and prior to 1972 all transmission line locations were approved by local governments. Moreover, since 1972 some localities have built schools next to existing transmission lines or uncleared rights-of-way.

However, the desirability of Connecticut's approach has been questioned by the chair of the Connecticut Siting Council. In testimony before JCOTS, she advised Virginia to not adopt or recommend legislation that would require all new transmission lines to be underground, but to instead review options for less visible overhead lines. Another option may be to increase the distance between new structures and rights-of-way ("setbacks"), a practice followed in California (*Code of Regulations*, Title 5, Section 14010(c)).

UNDERGROUNDING HAS NOT BEEN USED TO PROTECT HISTORIC RESOURCES

As previously discussed, Section 56.46.1 of the *Code of Virginia* requires the SCC to minimize adverse environmental impacts resulting from transmission lines and defines the term environmental "to include in meaning 'historic[.]'"Article XI of the *Constitution of Virginia* also promotes historic preservation by affirming a policy of conserving historic sites and buildings in the Commonwealth.

Overhead and underground transmission lines each can affect nearby historic resources. Overhead lines appear most likely to impair the view shed or historic context of a resource rather than destroying the resource itself. In most cases, transmission towers can be placed to leave a resource such as a cemetery or historic home intact. However, the sight of towers and wires may detract from the historical appeal of a resource. By contrast, underground transmission lines appear more likely to impact archaeological resources such as historic artifacts or unmarked burial grounds.

SCC Guidelines Reflect Statutory Emphasis on Protecting Historic Resources

The guidelines issued by SCC staff ask utilities to list in their application any historic sites within or adjacent to the proposed right-of-way. According to the guidelines, these sites may include places on the National Register of Historic Places or the Virginia Landmarks Register, historic districts designated by a locality, and archaeological sites designated by the Virginia Department of Historic Resources (DHR).

Electric utilities appear to address potential impacts on historic resources in their transmission line applications. For example, in its application for a 230 kV line near Leesburg, Dominion noted that an alternate route would potentially impact Rokeby Manor, listed on the National Register of Historic Places; the Washington & Old Dominion Trail, eligible for the Virginia Landmarks Register; and the historic districts of Paeonian Springs and Leesburg (2005-00018).

State Agencies and Concerned Citizens Have Raised Concerns Involving Historic Resources

A review of past transmission line cases indicates that State agencies have raised concerns regarding historic assets during SCC proceedings. DHR and other State agencies routinely participate in the environmental impact reviews coordinated by DEQ. These agencies have reviewed their databases to identify any historic resources that could be impacted by a new transmission line.

One recent case in Loudoun County illustrates how State agencies can raise potential historic impacts that may otherwise not be considered. In its 2002 application for SCC approval of a 230 kV transmission line, Dominion did not identify any historic resources within or near its proposed right-of-way. However, during the environmental impact review coordinated by DEQ, DHR identified several archaeological sites in the project area and recommended that Dominion avoid these sites when locating transmission structures. DEQ subsequently recommended that the company work with DHR to determine the impact of the line on historic resources (2002-00702).

State agencies or concerned citizens cannot protect historic resources which have not yet been identified. Moreover, protecting known resources can be difficult when their historic value has not been fully determined. For example, in an ongoing case in Loudoun County, the Northern Virginia Regional Park Authority (NVRPA) has asserted that placing a new 230 kV line along the Washington & Old Dominion Trail is problematic because detailed natural and cultural resource studies have not been conducted. The NVRPA concluded that, for this reason, it could not identify the most sensitive areas of the trail (2005-00018).

SCC Has Used Design and Route Changes to Protect Historic Resources

A review of 76 SCC opinions since 1972 identified at least five transmission line cases in which impact on historic districts was a significant issue. As indicated by Table 14, in three of these cases the commissioners ordered steps short of underground installation to protect historic resources near the proposed lines. A 1989 case illustrates the willingness of the commissioners to approve a more expensive route in order to protect a historic asset. The commissioners granted a request by Dominion to convert an existing 115 kV line in Fairfax County to 230 kV, but rerouted the new line around the Sully Historic Site in order to minimize impact on the historic home (Figure 12).

Table 14: Commissioners Have Ordered Steps Short of Underground Lines to Protect Historic Resources

Transmission Line and Case Number	Design / Route Changes Approved By the Commissioners
Charlottesville-Remington (1980-00006)	Denied an application to rebuild an existing 115 kV line near Monticello in Albemarle County.
Loudoun-Clark (1988-00042)	Routed the line around the Sully Historic Site in Fairfax County.
Clifton-Cannon Branch (1989-00057)	Routed the line one block south of the historic district in the City of Manassas.
Carson-Clover 500 kV (1992-00058)	Noted that the line bordered Reams battlefield but would not affect its historic interpretation.
Loudoun-Morrisville/Gainesville 500/230 kV (1994-00036)	Relocated an existing line to accommodate the Manassas National Battlefield.

Note: All cases involved 230 kV transmission lines unless otherwise noted. The case in bold involved a proposal to build the line underground.

Source: JLARC analysis of transmission line cases reviewed by the SCC since 1972.

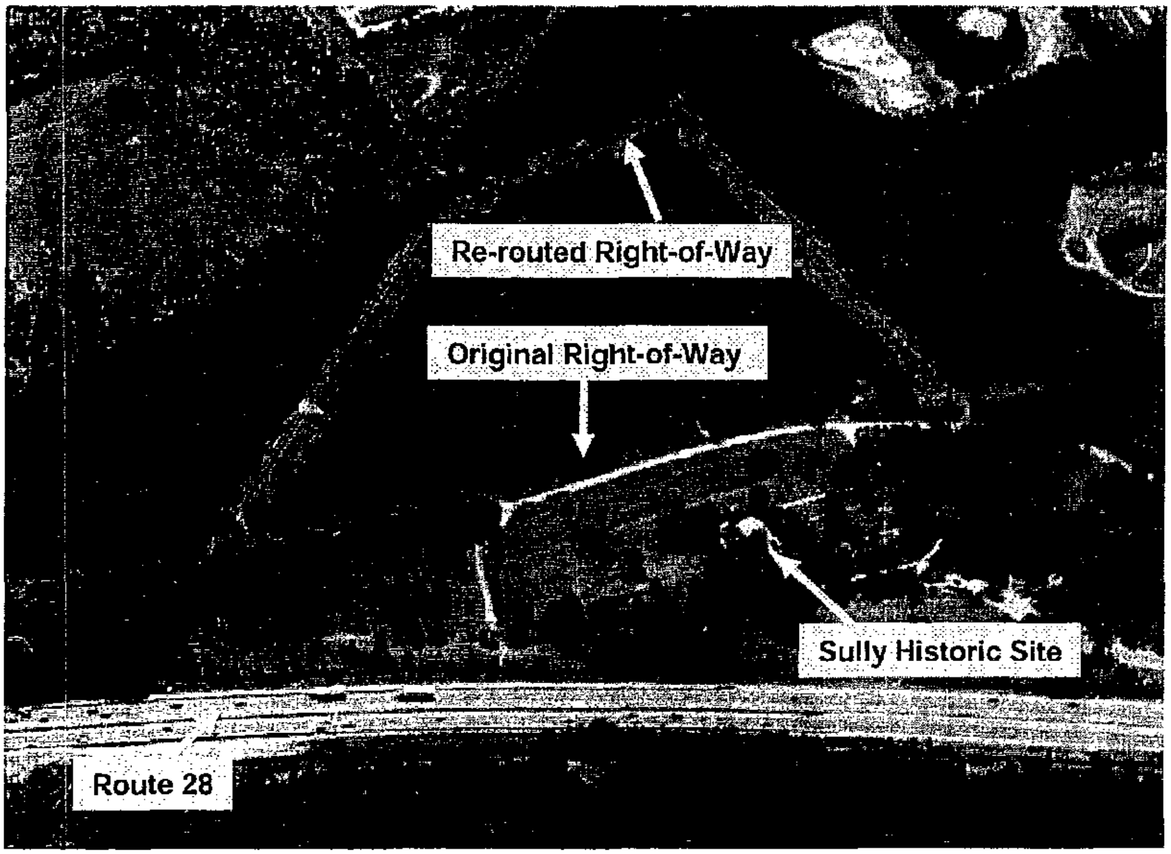
The proposed route would have traversed the Sully property on an easement owned by the company. The commissioners explained that while the route change "will increase the expense of this project to [Dominion] and to ratepayers... this additional expense is warranted in light of the value of Sully Historic Site" (1988-00042).

In a 1991 case, the commissioners altered the proposed route for a 230 kV line through the historic district of Manassas City instead of approving an underground section in the city. Historic Manassas, Inc., a respondent in the case, sought to place underground this portion of the line, citing the potential for transmission towers to clash with the two-story buildings in the historic district and isolate the district from the City of Manassas Museum.

The commissioners noted in an interim order that Dominion could seek authority to place underground part of the line if a local source of funding could be found. However, in a final order authorizing overhead construction, the commissioners rejected the underground alternative and routed the line one block south of the historic district, stating: "We do not find that minimization of the environmental impact as required by the statute requires construction of a portion of the transmission line underground" (1989-00057).

The commissioners also cited impact on historic resources in initially dismissing an application filed by Dominion to convert a 115kV line in Albemarle County to 230 kV. Although the new line would have occupied existing right-of-way along the entire route,

Figure 12: Relocation of Transmission Line to Protect Historic Site



Source: JLARC staff analysis of SCC final order in case 1988-00042. Imagery used with permission of Pictometry.

the commissioners cited the impact of replacing 55-foot wooden structures with 90-foot steel towers on the "unique historical quality in the area near Charlottesville" that included Monticello. The commissioners noted that Dominion did not adequately address potential impacts on historic resources, and concluded that the proposed line would not reasonably minimize adverse impact on the scenic and environmental assets. As a result, the commission dismissed the company's application (1980-00006). The reconstruction project was approved by the commissioners in 1984 after Dominion resubmitted its application (1982-00091).

Chapter 7 Higher Costs Have Typically Discouraged Use of Undergrounding

In Summary

The SCC has interpreted the statutory requirements in the Utility Facilities Act to require the least costly means of installing a transmission line which can be achieved while balancing other statutory factors. In recognition of factors besides costs, the SCC has taken steps in some cases to require the use of a more expensive route or other measures to mitigate the impacts of an overhead line.

Undergrounding, however, has not been used as mitigation tool. The SCC has only approved the use of underground lines in situations in which it would not add to the costs borne by ratepayers. In some instances, undergrounding has been approved because it was less expensive due to high right-of-way costs for overhead options. In three of the ten cases where undergrounding was approved, the approval was largely based on the availability of a third party that was willing to pay the costs, so there was no cost impact upon ratepayers.

Typically, however, underground lines are seen by Dominion and the SCC as costing substantially more than overhead lines. In most cases, therefore, underground alternatives are not presented by Dominion nor considered by the SCC, and have been rejected when raised as a mitigation alternative by parties to a case.

The cases reviewed by JLARC staff indicate that the higher costs typical of an underground line is one of the most frequently cited reasons for not allowing undergrounding. Transmission line construction costs are paid by all of a utility's ratepayers, and this is one reason given by the commissioners to avoid undergrounding. The commission has endorsed other mitigation efforts, however, such as longer routes, modified towers, or tree buffers.

STATUTORY FACTORS EMPHASIZE COST-EFFICIENCY, BUT COST ALONE DOES NOT DETERMINE CASES

Cost considerations have played an important role in transmission line cases before the SCC because of statutory provisions that stress cost-efficiency. As stated by SCC staff in testimony before the Joint Commission on Technology and Science, two of the "Criteria and Policies for Transmission Line Applications" used by the SCC are

- Section 56-234, which requires electric utilities to provide electric service at "reasonable" rates, and

- Section 56-235.1, through which the SCC is empowered to investigate public utilities to determine whether they "promote the maximum effective conservation and use of energy and *capital resources*" [emphasis added].

Section 56-46.1 also promotes cost-efficiency by requiring a utility to show that an existing right-of-way cannot be used before it acquires new easements.

Although economic development considerations are not strictly considered to be a cost factor, their consideration is also included in section 56-46.1. The commissioners are required by this section to "consider the impact of a proposed [transmission line] on economic development within the Commonwealth" before granting a certificate of public convenience and necessity. However, the statute provides no further definition of "economic development" or instructions on its application to transmission line cases.

Agency guidelines for transmission line applications ask utilities to provide the estimated cost of a project, and this estimate has been routinely included in recent applications. However, transmission line applications generally do not contain more detailed cost information, such as a breakdown of total cost, or the assumptions used to estimate the cost of material or labor. Additionally, the information routinely provided by utilities does not include cost information on undergrounding or on the impact that the line will have on economic development. This appears to result from the fact that the guidelines are intended only to request information that would be needed by the SCC to evaluate a typical transmission line application.

The commissioners have often sought to minimize construction costs when evaluating proposed and alternative transmission lines. This appears to be the main reason why undergrounding proposals have been rejected. A review of past SCC proceedings identified 27 cases since 1972 in which the commissioners cited cost factors to explain their decision. These cases are listed in Table 15. Cost discussions have been especially common when there was opposition to a line or alternative routes were proposed. Indeed, in nearly half of the 27 cases listed in the table, the commissioners rejected route or project alternatives that would have resulted in higher costs. In some of these cases, alternative routes were designed to minimize adverse impacts on the environment.

Although statutory provisions emphasize the need to minimize the cost of new transmission facilities, the commissioners have indicated that cost alone will not determine the outcome of a case. Other factors, such as the need to minimize environmental impact

Table 15: The Commissioners Have Routinely Cited Cost Factors When Reviewing New Transmission Facilities

Case and File Number	SCC Decision
Jackson Ferry-Axton 765 kV (1977-10848-A)	Rejected an alternative route because it would have required more land and cost more.
West Staunton-Harrisonburg (1979-20084)	Rejected a route change in part due to its higher costs.
Winterpock-Midlothian/ Chesterfield (1986-00060)	Cited cost savings of designing towers to accommodate a future line.
Bull Run-Burke (1988-00004)	Cited taxpayer savings of $30,000 from accommodating VDOT road expansion.
Occoquan-Ogden Martin System (1988-00074)	Noted that Ogden Martin would fund the project and ratepayers would not bear the cost of construction.
Loudoun-Clarke (1988-00042)	Additional costs were justified to protect the Sully Historic Site.
Pender-Oakton (1988-00079)	Noted that overhead construction would have been double the cost of an underground line.
Hopewell-Firestone Plant (1989-00050)	Noted that Firestone would fund the project and ratepayers would not bear the cost of construction.
Midlothian-Trabue (1988-00071)	Rejected undergrounding in part because of higher cost.
Chesterfield-Chickahominy (1989-00073)	Rejected an alternative because it would not have addressed need and ratepayers would ultimately bear the cost.
Clifton-Cannon Branch (1989-00057)	Rejected an alternative substation site because it would have required additional land and increased costs.
North Pole-Oilville-Short Pump (1991-00027)	Rejected alternative routes in part because of their higher costs.
Clover-Carson 500 kV (1992-00058)	Rejected a 230 kV line due to the estimated $66 million in line losses that would have resulted.
Southern Virginia (1994-00022)	Cited the benefits of avoiding $50,000 in litigation costs.
Goshen-Low Moor (1995-00057)	Rejected alternatives in part due to higher costs.
Jefferson Street-Glebe (1995-00134)	Noted that the City of Alexandria would reimburse Dominion for the costs of underground installation.
Tap to Proposed Motorola Substation (1995-00088)	Determined that while mitigation measures would increase the project's costs, this increase would not be excessive.
Chickahominy/Darbytown-White Oak (1996-00115)	Rejected an alternative route due to higher costs.
Moore Substation (1996-00360)	Noted the project would reduce wholesale power costs.
Dulles-Reston (1999-00009)	Rejected an alternative due to its higher costs.
Sewells Point-Navy South (2002-00180)	Noted that the Navy would pay the $9 million cost of underground installation.
Beco and Greenway Lines (2001-00154)	Rejected placing a line along the southern edge of the W&OD Trail in part due to the need to buy additional right-of-way.
Dooms/Elmont-Tenaska Power Plant 500 kV (2001-00663)	Noted that Tenaska would fund construction of the new line.
Fentress-Shawboro (2004-00064)	Noted that the proposed project was the least costly alternative.
Brambleton-Greenway (2002-00702)	Rejected an underground alternative due in part to the higher cost of construction.
Bristers-Morrisville 500 kV (2004-00062)	Rejected alternative routes due to their higher costs.
Churchland-Sewells Point (2004-00139)	Noted that an underground line was cheaper than generation and comparable to overhead construction.

Note: All cases involve 230 kV transmission lines unless otherwise noted.

Source: JLARC analysis of transmission facilities approved by the SCC since 1972.

or ensure service reliability, must be considered and may justify more expensive transmission facilities. The commissioners appear to have sought a balance of these factors, approving measures that have a substantially smaller financial impact on a new transmission line than underground construction.

SCC HAS APPROVED SOME ADDITIONAL EXPENDITURES TO MINIMIZE ADVERSE IMPACTS OF OVERHEAD LINES

In at least four transmission line cases since 1972, the commissioners approved overhead routes that were more expensive than the original route proposed by the utility. These additional costs were required in order to minimize the adverse impact of a proposed line, and the commissioners explicitly discussed why a more costly alternative was justified. In three of these cases, the mitigation efforts—the costs of which were borne by all of Dominion's customers—were designed to minimize the visual impact of overhead lines on nearby homeowners:

- maintenance of a tree buffer through a permanent easement or outright purchase of the land (1995-00088),
- approving a route one mile longer and $1.6 million more expensive than the route proposed by Dominion (2001-00154), and
- approving a route in Loudoun County more than twice as long and approximately 70 percent more expensive ($4.7 million) than the shortest possible route, the use of which may have required the demolition of homes (2002-00702).

However, cost concerns sometimes outweigh the potential benefit that could be obtained, as illustrated in a recent case in Loudoun County where the commission approved a route that protestants said would require elimination of a tree buffer. The final order indicated that this action was taken because the alternative route would have required additional right-of-way at a cost of approximately $3 to 3.5 million (2001-00154).

TRANSMISSION LINE PROJECT COSTS ARE PAID BY ALL RATEPAYING CUSTOMERS OF THE UTILITY

For many years there appears to have been a concern among the commissioners and SCC staff that the high cost of underground construction places an unfair burden on ratepayers. This results from the SCC's interpretation of Section 56-234, which requires electric utilities to provide electric service at "reasonable" and also "uniform" rates. The uniformity requirement has been interpreted by the SCC to require that transmission line costs need to be borne by all of a utility's customers. This interpretation has been raised when undergrounding has been advocated. In a 1991 case, the hearing examiner wrote that the costs of a proposed underground line would be paid by every electric customer of the utility (1989-00057). This concern was echoed in a 2004 case in Fauquier, where the hearing examiner stated that "Dominion's ratepayers as a whole should not be burdened with the expense of an underground transmission line unless there is no reasonable overhead option available" (2004-00062).

Virginia's Restructuring Act Has Temporarily Frozen Electricity Rates

The Virginia Restructuring Act of 1999 capped and effectively froze Dominion's base electricity rates. In addition, Dominion's fuel factor – the portion of rates used to recover fuel costs from customers – was frozen for the period from January 1, 2004, through July 1, 2007, and Dominion cannot recoup these costs. Dominion will be able to receive annual fuel factor adjustments from July 1, 2007 through July 1, 2010.

Starting January 1, 2011, the Restructuring Act calls for rates for electricity supply service to be based on market prices. Under the Act, the SCC will set default rates for electric supply for customers who do not buy power from competitive providers. The Act directs the SCC to base these rates on prices in competitive regional electricity markets (such as PJM), and to consider factors such as customers' need for rate stability and protection from unreasonable rate fluctuations.

In response to a question posed by JLARC staff about commission policy on electricity rates, the commissioners noted that they have

> rejected alternative routes or alternative construction method for which the benefits did not, in the Commission's evaluation of the evidence, outweigh the increased costs that would be borne by all ratepayers. Conversely, the Commission has also approved alternative routes that satisfy this analysis. In other words, the Commission has not approved alternative routes or construction methods that would (1) result in significantly increased costs for all ratepayers, but (2) benefit only a particular subset of ratepayers (by, for example, reducing environmental externalities for those particular ratepayers).

This concern results from the manner in which utilities used to recover transmission line costs. Historically, it appears that the typical practice of the SCC has been to certify construction of a transmission line and associated facilities, not to approve cost-recovery. As noted in a 1996 underground case in Alexandria,

> Our approval of the Company's project does not constitute authorization for Virginia Power to recover the cost of its construction project in rates. The Company remains subject to the burden of proof articulated in Va. Code § 56-234.3, and other statutes in Title 56 of the Virginia Code (1996-00071).

Prior to restructuring, the commission did not determine that a utility could recover the funds it expended on a project until a subsequent rate hearing, where the costs of that project were subject to examination. If these costs were determined to be prudent and necessary, they would be considered along with all of the utility's costs to determine if a change in electricity rates was warranted.

This recovery mechanism appears to have changed for the time being. Presently, the costs associated with most transmission line projects undertaken by Dominion while electricity rates are capped are not borne by retail customers (such as homeowners) in the same manner as they were prior to restructuring. As noted by SCC staff and Dominion in a recent Loudoun County case, at the present time the higher costs resulting from underground projects are borne by Dominion's shareholders. However, because project costs are repaid over many years, after the rate cap expires the general body of retail customers (ratepayers) will become responsible for paying the remaining balance of the costs—which is a far larger amount than will be paid by shareholders (2002-00702).

Although Dominion's shareholders will shoulder these costs until the rate caps expire, SCC staff note that Dominion may be able to recover some or all of these costs through other means. This may occur, for example, through increased electricity sales if a new transmission line results in the addition of new customers. New transmission lines, therefore, may not only serve existing customer demands but also allow development to generate new customers and thus increased electricity sales.

Because the rate caps limit the ability of Dominion to recover costs from Virginia retail ratepayers, the company has the option of recovering these costs through other means. Dominion could pass on the costs of transmission line projects by renegotiating contracts with wholesale customers in Virginia (municipalities, State agencies, electric cooperatives), wholesale customers in other states, or to retail customers in its North Carolina service area. Other options available to Dominion appear to include petitioning the Federal Energy Regulatory Commission (FERC) to increase Dominion's transmission rates (although the caps would limit the usefulness of this option) or to defer its transmission project costs until after Virginia's rate caps expire. Dominion has already taken the latter step with regard to certain expenditures associated with joining PJM (the regional transmission organization), and has requested permission from FERC to defer the recovery of $240 million until after the caps expire.

UNDERGROUNDING HAS BEEN APPROVED WHEN LESS COSTLY OR WHEN RATEPAYERS ARE NOT AFFECTED

In 17 transmission line cases, underground construction has been proposed. In ten of these cases Dominion proposed an underground line in its application, and the company's proposals were approved in each case. In these ten cases, the underground proposal was seen as cost-efficient for ratepayers because either (1) the undergrounding option was less expensive, or (2) there was a third party willing to pay the cost of undergrounding.

In the remaining seven cases, respondents promoted undergrounding in order to avoid the potential impacts of an overhead line. Undergrounding was rejected in each of these cases, and cost concerns were cited by the commissioners in three instances. The commissioners concluded in these cases that the disadvantages of underground construction outweighed the potential benefits:

> There is no evidence that benefits will accrue to the Company or its ratepayers which outweigh the increased costs and risk of reliability problems associated with the underground installation of a portion of the proposed transmission line (quoted in cases 1988-00071, 2002-00702, and 2004-00062).

Undergrounding Can Be Less Expensive Where Land Values Are High Due to Right-of-Way Costs

Obtaining new easements for a transmission line can be a significant expense, especially when real estate values are high or condemnation proceedings are required. Because underground lines require smaller rights-of-way, undergrounding may be less costly than overhead lines in areas with high land values.

As Table 16 indicates, in eight cases the commissioners have approved underground lines in Northern Virginia, where the density of urban development and land prices have been higher than other regions of the State. In each of these cases, Dominion proposed underground construction because it had determined that no viable overhead route was available or that an underground line was more cost-effective.

Although the expense of acquiring right-of-way was likely a major factor that resulted in the lack of an overhead route, cost was explicitly cited as a factor by the commissioners in only two of the ten cases. However, in one of these cases the line runs through several apartment complexes (Figure 13), which could have resulted in the displacement of many individuals who were not landowners. This fact suggests that a desire to not displace residents—an environmental factor—is also a strong consideration.

A case from Fairfax County illustrates how land values can influence the use of underground transmission lines. In a 1989 opinion approving a 3.5-mile underground line, the commissioners noted that an overhead line would cost approximately $46.7 million, more than double the $21.2 million cost of building an underground line. Dominion attributed these costs to high land values and the 120-foot right-of-way required for overhead construction compared to 25 feet for the underground alternative (1988-00079). As discussed in Chapter 10, in some cases urban development may preclude overhead construction even though easements for an overhead line have already been obtained.

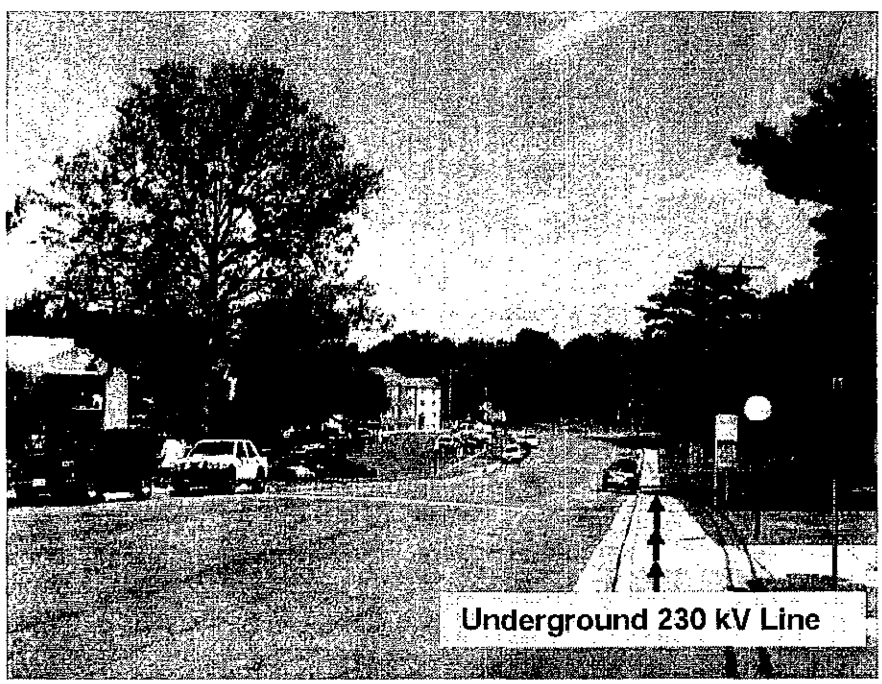
Table 16: The Commissioners Have Approved Underground Lines in Areas With High Land Values

Transmission Line and File Number	Locality	Line Length (Miles)	ROW Width (Feet)
Glen Carlyn-Clarendon (1982-00075)	Arlington County	2.0	35
Jefferson Street-Glebe (1983-00036)	City of Alexandria	0.34	17
Braddock-Annandale (1983-00059)	Fairfax County	3.6	Unavailable
Burke-Sideburn (1986-00019)	Fairfax County	2.2	20
Glebe-Davis (1988-00063)	Arlington County	2.4	30
Pender-Oakton (1988-00079)[1]	Fairfax County	3.5	25
Jefferson Street I (1995-00134)	City of Alexandria	0.32	24
Jefferson Street II (1996-00071)	City of Alexandria	2.4	8

Note: All transmission lines are 230 kV. Some of these lines also may have included temporary construction easements.
[1] The Pender-Oakton line was not built.

Source: JLARC analysis of transmission line applications filed with the SCC.

Figure 13: Underground May Be Preferable Where An Overhead Line Would Displace Many Residents



Note: Parallel lines in photograph are shadows cast by overhead distribution lines and do not indicate route of underground line.

Source: JLARC staff photograph showing location of an underground 230 kV line under a sidewalk in Fairfax County.

However, an overhead line may be required in areas with high land values if the available right-of-way is not conducive to underground construction. Rocky terrain can increase construction costs substantially, potentially eliminating some of the savings associated with smaller land acquisitions. Unanticipated developments, such as the discovery of pollutants or sensitive environmental resources, can also increase the cost of underground construction and may require overhead lines instead.

Undergrounding Has Been Approved If Costs Paid By Third Party, But Dominion No Longer Favors This Practice

In three cases, Dominion has requested permission to use an underground line because a third party was willing to pay for the costs. The willingness of a third party to bear these costs appears to have been motivated by economic development considerations in two of these cases. Economic development also played a role in three other cases involving undergrounding, and these cases confirm the rule that undergrounding has only been used when a third party is available or if an overhead route cannot be found.

The earliest instance of this arrangement occurred in 1982, when the company built an underground line after Arlington County agreed to purchase the right-of-way from Dominion and also "contribute to the cost of installing the overhead line underground." This information is in the company's application but is not in the final order, so it is unclear why this arrangement was made or if Arlington paid the total additional cost of undergrounding (1982-00075).

Dominion articulated its position during a 1991 case in the City of Manassas (1989-00057). In this case, a 230 kV overhead line was proposed to pass through the historic district. Respondents argued for undergrounding, stating that the overhead line would harm the local business community by making the historic downtown district less appealing for tourists. As noted in the hearing examiner's report, Dominion stated that it would use underground lines in three situations:

- where no viable overhead route was available,
- when the cost of an overhead line exceeded the cost of underground installation, and
- if the incremental cost of underground construction was paid by a third party.

In their opinion authorizing overhead construction, the commissioners stated that Dominion could seek SCC approval to build the line underground if a local source of funding was identified, but no third party was ever identified.

Dominion has agreed to underground a line twice since that time when a third party paid the additional costs:

- In December 1995 agreed to bury 1,700 feet of an existing overhead 230 kV transmission line near Jefferson Street in the City of Alexandria. As noted above, this line already included an 1,800-foot section buried in 1983 as a result of the Richmond, Fredericksburg, & Potomac Railroad Company (RF&P) easement, and Dominion would later seek authority to bury an additional 13,000 feet of the overhead line in May 1996. The City was seeking to place the 1,700-foot section underground in order to permit construction of a planned hotel, convention center, and African-American heritage park and agreed to finance the project.
- In 2002, the U.S. Navy agreed to pay for placement of a 0.5-mile section of new 230 kV line underground. The underground line would "enhance views of the area" and avoid the need for tall transmission towers that could pose a hazard to aircraft (2002-00180). Dominion staff note that any potential reliability problems resulting from this line would only affect the naval base and as such did not justify avoiding the use of undergrounding.

In a more recent case from Loudoun County, the commissioners declined to order undergrounding—even though some parties argued that it would benefit economic development activities—because no third party was willing to bear the costs. The hearing examiner cited continued economic development as a benefit of installing a three-mile section of a 230 kV line underground, concluding that undergrounding would "clearly mitigate the adverse impact of the line on economic development and the environment of this area" (2002-00702). However, no third party was identified and a viable overhead route was available. The commissioners rejected underground construction in their 2004 opinion.

In two other cases that involved economic development considerations undergrounding was requested by Dominion even though no third party was identified. However, undergrounding was necessary because no viable overhead route was available. Dominion had two 230 kV overhead lines that crossed property owned by RF&P. RF&P notified Dominion of a planned hotel and convention center in 1983 (1983-00036), and subsequent retail, residential, and warehouse developments in 1996 (1996-00071). These lines served major portions of Fairfax and Arlington Counties, and the City of Alexandria, and had to be kept in service. However, under a 1969 right-of-way agreement with RF&P, Dominion agreed to relocate the overhead lines if they interfered with the development of the property.

During interviews for this report, however, Dominion staff indicate that the company has changed its position on this matter. Dominion staff state that their increased experience with the problems associated with underground lines mean that they no longer prefer undergrounding, even if a third party will bear the costs.

SCC AND DOMINION HAVE POINTED TO HIGHER COSTS OF UNDERGROUNDING AS A REASON TO AVOID ITS USE

A 2005 SCC staff report noted that one of the key reasons that transmission lines "are not customarily built underground" is that "underground transmission is extraordinarily costly." The extraordinary nature of the expense appears to be a key factor in why the SCC has used various means to mitigate the impact of overhead lines, but has not approved the use of undergrounding for this purpose.

In most transmission cases before the SCC, undergrounding is not presented by Dominion as an option nor considered by the SCC. In a recent case, the SCC noted that the absence of undergrounding alternatives in the case was not surprising, given the issue of ratepayer expense.

> [The company includes] no alternatives that are underground routes. This is not surprising, given that the line can be built overhead. No utility in Virginia has ever built a transmission line underground at ratepayer expense, unless there were extraordinary technical difficulties to building it overhead. Neither has any transmission line been built underground in Virginia at ratepayer expense for aesthetic purposes.

In all seven cases in which respondents to a case promoted undergrounding as a means to avoid the potential impacts of an overhead line, undergrounding was rejected, with cost concerns cited by the commissioners in three instances. The commissioners concluded in these cases that the disadvantages of underground construction outweighed the potential benefits:

> There is no evidence that benefits will accrue to the Company or its ratepayers which outweigh the increased costs and risk of reliability problems associated with the underground installation of a portion of the proposed transmission line (1988-00071, 2002-00702, 2004-00062).

In some instances, experts on behalf of respondents to Dominion's applications before the SCC have presented cost estimates that are lower than Dominion cost estimates. However, there have not been dramatic differences between the costs as seen by respondent experts and Dominion's underground cost estimates. Respondent experts have confirmed the point that undergrounding would be several times more expensive. Differences seem to center on whether the ratio of underground to overhead costs is closest to four or five or six to one.

For example, in 2004, an expert for respondents to a Dominion application estimated a cost for a 230 kV XLPE line of 3.25 miles that equated to about $6.55 million per mile. Relative to Dominion's estimate of overhead costs of about $1.57 million per mile, respondents were in effect indicating that the underground line would be about 4.2 times as expensive as an overhead line. Dominion staff indicated a belief that the respondent's estimate was understated, however, and instead indicated that if all appropriate costs were included the ratio would be closer to five to one.

In 2005, another expert for respondents to a Dominion application estimated an installation cost for a 230 kV XLPE line that equated to about $4.7 million per mile. This cost did not include right-of-way costs and other miscellaneous costs not categorized as material and labor costs for installation. Similarly in 2005, Dominion presented a cost estimate for a 230 kV XLPE underground line for JCOTS. Excluding the types of costs not addressed by the respondent expert, Dominion's 2005 estimate was $5.96 million per mile, and its full installation cost estimate (with right-of-way) equated to about $6.4 million per mile. Compared to the cost figure Dominion gave to JCOTS for a 230 kV overhead line—which was about $1.06 million—the estimate of the respondent's expert produces a ratio of underground to overhead costs of about 4.4 to one. Use of Dominion's estimate without right-of-way produces a ratio of 5.6 to one, and use of Dominion's estimate with right-of-way produces a ratio of about six to one.

Chapter

8 Impact on Property Values and Feasibility of Payment by Surrounding Landowners

In Summary

One cost factor that the SCC does not appear to explicitly consider is the impact of an overhead line on property values. In recent transmission line cases, the available record indicates that the hearing examiner reviewed evidence on property values and in two recent cases found that overhead transmission lines diminished property values. However, instead of explicitly incorporating diminished property values into a calculation of how to best mitigate the effects of transmission lines, the commission appears to qualitatively weigh this factor with the other factors under consideration. The commission has in many instances ordered other types of mitigation—use of tree screens, re-routing of lines, or alternate tower designs—but has never ordered undergrounding as a result of an impact on property values.

The feasibility of allowing surrounding landowners to pay for underground lines is limited. Salient factors include the difficulty of obtaining timely estimates of underground costs, the characteristics of the land along the selected route, the potential impact of anticipated increases in electricity rates on willingness to pay for undergrounding, and statutory restrictions in the use of special assessments.

Landowners near the routes proposed or selected for overhead transmission lines have often expressed concern that the lines will negatively affect the value of their property. These concerns result from the potential unsightliness of the lines as well as concerns about health risks. These issues are examples of externalities: costs that may not be included in the estimated cost of proposed lines. If these external costs are not included in the cost estimates, then certain property owners may bear unreimbursed costs resulting from the physical location of the line. Residents of some communities have expressed the desire to pay for the burial of a transmission line themselves in order to avoid what they perceive as negative characteristics of an overhead line.

Dominion and the SCC do not appear to have a consistent and uniform policy of using the estimated cost impact of overhead transmission lines on property values in determining the overall cost of a project. Instead, Dominion and the SCC have at times responded to these concerns by adjusting the proposed route of the line or taking other measures to mitigate the line's impacts. However, to date in Virginia, undergrounding has not been used as a means of addressing the potential impact on property values.

PROPERTY VALUES DO NOT APPEAR TO BE EXPLICTLY CONSIDERED AS A FACTOR BY THE COMMISSION

Although the SCC has clearly considered cost as a primary factor in its review of transmission line applications, the final orders issued by the commissioners have not specifically noted property values. In contrast, reports by SCC staff and hearing examiners have devoted substantial attention to property values.

The lack of explicit consideration should not be taken as an indication that property values are not included in the commission's analysis. Many of the mitigation measures ordered by the commission (some of which were proposed by the utility) result from an effort to lessen the impact of the line upon the environment. These measures include the use of existing right-of-way, the maintenance of tree buffers, and the use of shorter or non-reflective towers. These steps likely lessen the impact upon property values because the literature indicates that proximity to a line and its impact upon the view shed are two factors that affect a transmission line's effect on property.

There is no written evidence from the cases reviewed that property values are explicitly considered by the commission, nor does the *Code of Virginia* include the impact on property values as a defined component of "cost." These issues may have prompted the call for JLARC to investigate property values as a factor. The legislative mandate for this study notes that "the costs of constructing overhead transmission lines may impact tax revenue, economic development, and property values in the immediate area of the transmission lines" while also noting that "it is in the best interest of the public to provide for the least costly alternative in constructing electrical transmission lines." Moreover, the mandate specifically calls for an examination of "the effect on property values resulting from installing underground, as opposed to overhead, electrical transmission lines."

Property Valuation Studies Appear to Indicate that Transmission Lines Decrease Property Values

JLARC staff reviewed literature on the effects that various features of the landscape have on property values. The studies reviewed were typically published in *The Appraisal Journal* and the *Journal of Real Estate Research*. Staff were not able to locate any studies that specifically considered the effects on property values from underground transmission lines.

JLARC staff focused on more recently published studies largely because studies from the 1960s and 1970s, some of which concluded that there was no negative effect from transmission lines, were published before electromagnetic field (EMF) concerns became widespread. In the intervening years, various state supreme courts and federal circuit courts have found that the public's belief that EMF is harmful is an adequate basis for compensation in a condemnation proceeding even though there is no conclusive scientific evidence. As noted by the Florida Supreme Court in a 1987 case that involved 500 kV transmission lines, public fear may be considered even without scientific justification so long as it affects property values (Florida Power & Light Co. v. Jennings, 518 So.2d 895). It does not appear that Virginia courts have adopted this position, however.

Literature Indicates That Effects on Property Values Result from Two Features. First, transmission lines are in many cases not perceived to be attractive. Second, the public belief that EMF causes cancer can decrease demand for properties near transmission lines and in turn lower property values. The extent to which some buyers may place a premium on avoiding transmission lines is indicated by a 1994 article in the *Washington Post*, which described how some home buyers were adding EMF contingency clauses to their purchase contracts, where the sale would be nullified if EMF levels exceeded a specified threshold.

The studies reviewed conclude that there is an effect on property values of up to 15 percent. For example, a 1992 review of previous studies by the Edison Electric Institute (EEI), an association of investor-owned electric companies, concluded that "overhead transmission lines have the potential to reduce the sales price of residential and agricultural property," and that "the effect, especially for single family homes, is generally small (from zero to 10 percent), but has been estimated to be greater than 15 percent in some specialized cases in rural areas." The EEI review noted that two of the 57 studies analyzed indicated that the effect on property values diminishes over time. EEI added, however, that "impacts appear to last for several years at least, affecting property owners who expect to sell within the first few years following transmission line construction."

In a 2006 *Journal of Real Estate Research* article, the authors concluded from their analysis of 58 peer-reviewed journal articles that proximity to a detrimental feature (such as transmission lines, power plants, railroad tracks, landfills, shopping centers, and animal feeding operations) produced an average loss in property value of 9.5 percent; this applied to properties located within two miles of the site. The authors made several other observations that may be relevant when considering the potential effects of transmission lines on property values:

- Losses may be higher in areas where the rate of appreciation is lower.
- Different buyers may place a higher premium on avoiding certain detrimental features: a person who is concerned with EMF may not dislike living near a busy highway.
- Properties may be affected in ways other than a decrease in sales price, such as a longer time on the market or difficulty obtaining certain types of financing.
- The extent of the impact is driven by factors such as the type of property, its distance from the detrimental features, and the length of time that the feature has been present in the landscape.
- Negative effects may be offset by positive effects, such as presence of parkland on transmission line rights-of-way.
- Many factors can reduce property values, such as landfills and highways, and these may have a larger effect than transmission lines.
- The extent of the impact may depend on the extent to which other detrimental features are in the same area: the presence of several transmission lines may have a different impact than the presence of a single line.

Assessors Express Divergent Opinions Regarding Effect on Property Values. JLARC staff also contacted organizations in Virginia that may have knowledge of the potential impact of transmission lines. Staff spoke with a representative of the Virginia Association of Assessing Officers (VAAO), who stated that transmission lines may affect property values but that it depends upon the nature of the property and its location. The representative, who is a local assessor, also added that many subdivisions are built close to detrimental features, such as interstate highways, but that people keep buying the houses and the values keep increasing. In other words, "A ruckus over construction doesn't always translate into a loss of value." He concluded, however, that transmission lines probably do have an effect.

In contrast, another local assessor stated that he has "not seen any value impairment" and that this results from the fact that an assessor "can never prove that there is an effect in the market." He attributed this to the fact that in his locality, there are always enough people willing to buy a house, and as a result, there is not a discernible effect on property values.

These divergent opinions are important because they indicate that the impact on assessed values—and hence on local real estate tax revenues—may differ from locality to locality. In other words, if assessors in one locality do not believe that transmission lines have an effect or feel that they could not establish an effect, then assessed values may not be affected. However, as indicated by the VAAO representative, assessors may "make a presumption that even though they are looking for the market to tell them what the impact is, they may take a conservative approach and assume that there is an effect." As a result, the representative cautioned that sale prices, not assessed values, should be relied on as the most accurate indication of a marketplace effect.

In addition to local assessors, staff twice contacted the Home Builders Association of Virginia, and the Virginia Association of Realtors, but neither organization provided a response.

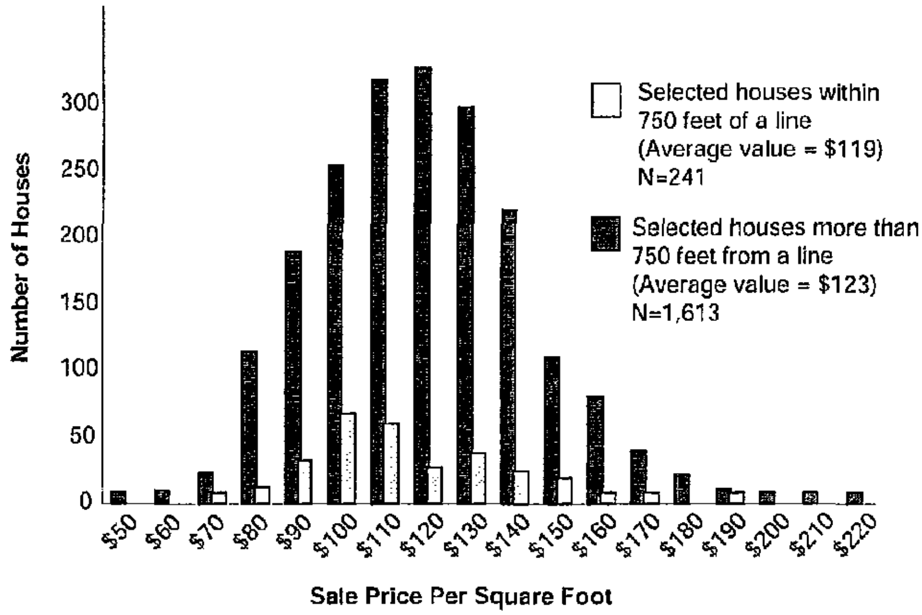
Case Example Indicates that Proximity to a Transmission Line Is Associated With a Decrease in Property Values

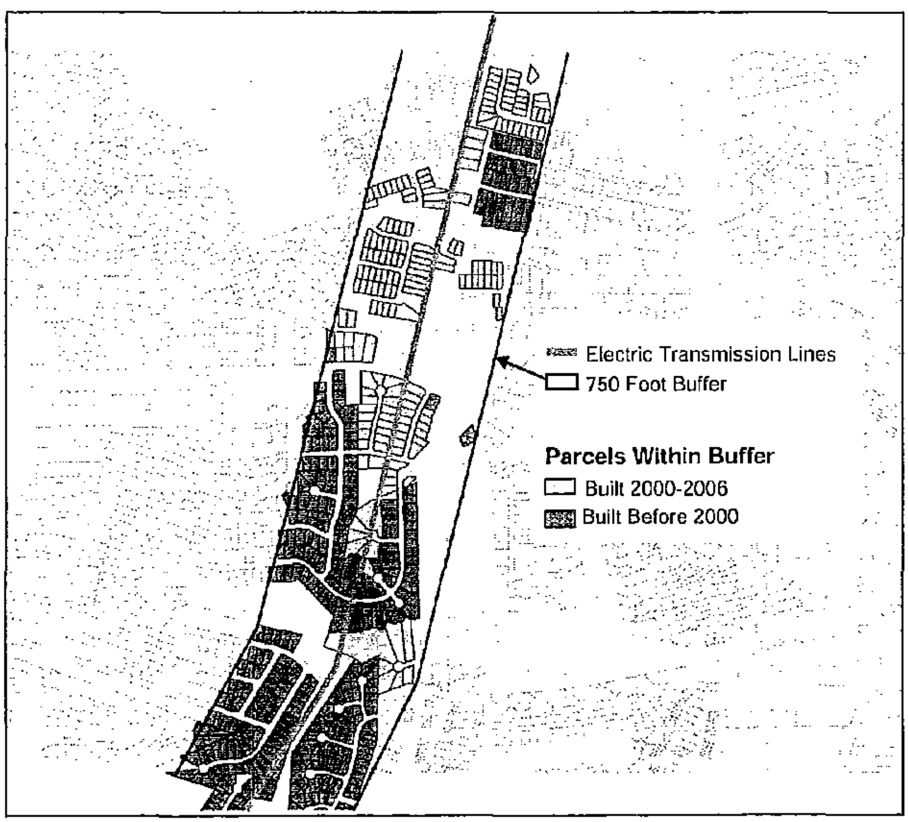
JLARC staff explored the use of geographical information system (GIS) data to address the mandate's question regarding the impact on property values. GIS data on the location of transmission lines was requested from Dominion but was not provided for the reasons indicated in Chapter 10. JLARC staff instead used information available from federal and State agencies, local governments, and other published information.

To conduct the analysis, JLARC staff examined assessment data from the County of Henrico. As advised by the assessors contacted for the study, the analysis focused on houses that were as similar as possible and also used sale prices instead of assessed values. As of June 2006, Henrico had 108,148 parcels of land, of which 6,187 had a single-family residence that was sold (for a non-zero price) in 2005. Of this group, 1,854 of the houses were built from 2000 to 2005.

GIS was then used to construct a buffer 750 feet wide around the overhead transmission lines (voltages of 115 kV and greater), and parcels were selected that had their center within this buffer. This resulted in the selection of 241 houses. As indicated in Figure 14, the average sale price per square foot (of finished area) of the 241 houses within 750 feet of the transmission line was $119, compared to an average price of $123 for the other 1,613 houses. This is a decrease of 3.25 percent. JLARC staff next looked at specific types of houses, and the results changed slightly. For example, among colonial style houses, 109 were in the buffer and 1,140 were not. Colonial houses within the buffer had an average value of $117 per square foot compared to $123 for the other colonial houses. This represents a decrease of 4.88 percent. In all of these calculations, excluding extreme values, based on standard

Figure 14: Proximity to a Transmission Line Is Associated With a Decrease in Property Values (Top) and New Houses Are Sometimes Built Next to Transmission Lines (Bottom)





Source: JLARC staff analysis of assessment data from County of Henrico, and JLARC staff observations of the location of 115-, 230-, and 500-kV transmission lines using data from the Virginia Department of Economic Development, the County of Henrico, the Virginia Department of Transportation, and the United States Geological Survey.

deviation or other means, did not change the results. Figure 14 also illustrates another aspect of this debate: many houses have been built right next to transmission line rights-of-way.

Concerns Over EMF and the Visual Impact of Lines Have Been Noted in Some Transmission Line Cases

Based upon the record available to JLARC staff, six cases were identified in which property values played a role. In one case, 1994-00022, that role was very limited; the other five cases reveal a mixed picture, in which transmission lines are deemed to affect property values in some cases but do not appear to be a deciding factor in others. Where property values appear to affect the outcome, the result is that changes are made to the route or type of transmission structure. Property values do not appear to have been used by the hearing examiner or the commissioners, however, as a factor in determining the cost of an overhead line in comparison to an underground line.

One Case Suggests the Commission Did Not Believe It Had to Consider Property Values. The commission took notice of property values as a concern in one case, but did not find that factor to be a sufficient reason to deny the application. The case involved two 230 kV lines in Halifax County, and only one person objected to the lines. In the final order, the commissioners observed that the landowner was concerned about the impact of the line upon a farm she owned, but noted that

> her concerns relate primarily to the impact of the lines on property value. While this is a legitimate concern, [she] has identified no adverse impact on environmental or cultural attributes of the area which the Commission must consider (1992-00043).

Concerns Over Adequacy of Compensation in Eminent Domain Proceedings Was Noted in One Case. One of the most contentious cases reviewed by the SCC was the $306 million, 90-mile Wyoming to Jackson Ferry 765 kV transmission line built by Appalachian Power Company (AEP). In its consideration of this line, the SCC considered—among several other factors—the potential impact of the line upon property values. Several public witnesses testified, and expressed two particular concerns regarding the extent to which eminent domain proceedings would fully compensate them for lost value. First, witnesses noted that many families in the area live on land that has been passed down for generations and as such attach a value to the land that a "fair market price" may not include. Second, witnesses argued that payment for a right-of-way through a portion of the property would not account for the loss of value to the rest of the property, an occurrence termed consequential damage.

In rebuttal testimony, an expert witness concluded that "no consistent or systematic impact on real estate prices of properties within one-fourth of a mile of a 765 kV transmission line was found, except for properties actually traversed by the right-of-way." The hearing examiner noted that this testimony was not cross examined.

In his report from October 2000, the hearing examiner noted that the "impact of a transmission line on property values is a consideration in this proceeding" and that although "the impact on property values cannot be avoided, it can be minimized with the shorter route and final right-of-way siting." It does not appear, however, that the potential monetary impact upon property values was included in the cost estimate for the line. This would be in keeping with the commission's reluctance to quantify externalities, particularly if doing so would give greater weight to those factors over others that are not quantified.

Another distinguishing feature of this case is AEP's policy of offering to purchase—at 100 percent of fair market value—any parcel on which a primary residence or structure used for daily business is located within 100 feet of the edge of the right-of-way. This policy is in place for up to one year after the line is energized. The commission's decision making appears to have considered this policy because the final order of May 2001 stated that approval of the application was conditioned on AEP's commitment to implement mitigation measures, and this policy was included as one of several mitigation measures attached to the order.

Recent Case in Loudoun County Involved the Link Between EMF Concerns and Decreased Property Values. More recently, health concerns resulting from EMF exposure have been identified by public witnesses and the hearing examiner as a reason why property values will likely be diminished (2001-00154). This case was the first of three recent cases in Loudoun County and is known as "Phase I." In this instance, Dominion filed an application in March 2001 for two 230 kV lines (1.6 and 2 miles long, respectively). Another reason offered for a reduction in property values was the visual impact of the lines, and the hearing examiner made note that one subdivision did not have a tree barrier and had "no other way of mitigating the effects of the proposed transmission line."

At public hearings, the record indicates that 14 witnesses testified about the possible adverse health effects of EMF and the adverse impact of the proposed transmission line on property values. One group of homeowners retained an expert witness, who compared the selling prices of homes affected by the transmission lines with the selling prices of otherwise similar homes that were not affected. The witness adjusted for other quantifiable differences between the two groups, such as differences in square footage, and subsequently attributed the 15 percent difference in selling price to the impact of the transmission lines.

Based on the testimony of this witness, homeowners offered estimates of the impact on property values that could result if the transmission line followed the route segment (number 19) that they opposed:

- One homeowner was "worried about the effects of EMF and the loss of between $67,500 and $100,000 in value for his house."
- Another homeowner estimated that the proposed transmission line would "reduce the value of her home by between $50,000 and $75,000."
- A third witness argued that the segment opposed by the homeowners "was the most expensive route if the estimated $1.5 million to $2.25 million in lost property value for residential homeowners is considered."

As a rebuttal witness, Dominion offered the testimony of another expert, who found fault with the valuation methodology used by the other expert and argued that the results were inconsistent with other studies. The specific fault identified was the method of determining market value by comparing a single sale price for two individual homes and subsequently attributing the difference in sale prices to a single factor. In addition, the rebuttal witness pointed out that the resulting estimates were "inconsistent with published studies regarding the impact of transmission lines on property values, which usually peg the effects within + or – 10%."

In his report of January 25, 2002, the hearing examiner wrote that the testimony of the homeowner's witness was "more compelling," noting that this paired sales analysis was consistent with other residential property valuations he had seen. However, the hearing examiner observed that the paired sales analysis used a limited sample size (only six sales of homes without transmission lines to six sales of similar homes with transmission lines) and that the estimate of a 15 percent reduction was not in line with published studies. After taking these factors into account, the hearing examiner concluded:

> I find that the record in this case supports a finding that the 35 most affected homes in Regency and Cameron Chase will likely suffer a diminution in value of 5% to 10% and

> that 80 other homes in these neighborhoods will suffer a diminution in value of 1% to 5%.

The hearing examiner also noted that concerns about the health effects of EMF likely is one of the reasons why property values decrease:

> The testimony related to the effects or lack of effects of EMF, at a minimum, demonstrates why construction of the Greenway Line likely will reduce the property values of some of the homes in the Regency and Cameron Chase neighborhoods. In sum, though there is insufficient proof to link EMF from transmission lines with specific cancer risks, concerns continue.

In the final order in this case, which granted approval and remanded the case for further proceedings, the commissioners appear to agree with the hearing examiner's conclusions: "As found by the Examiner, Segment 19 will have a significant and detrimental visual impact on existing homes and businesses." The commissioners found that the line was needed and that an alternate route—one that differed from the segment protested by homeowners—should be used.

Subsequent Loudoun County Case Involved Whether Property Owners Should Have Known the Line Was Planned. Another policy issue is apparent from the record of a second transmission line case in Loudoun County: whether knowledge of the proposed line would have affected the decisions of landowners to purchase their property. In this case, known as Phase II, Dominion filed an application in December 2002 for a 230 kV transmission line of approximately 8 miles in length. In its application, Dominion noted that residents were concerned about the impact that various routes might have upon property values and it appears that these factors were taken into consideration.

In her report, the hearing examiner included the testimony of several witnesses whose statements indicate that a lack of information about the proposed line was a common concern. Three witnesses stated that they were unaware that a line would be built when they purchased their property. In addition, a member of the General Assembly testified about the foreknowledge of landowners. According to the hearing examiner's report, the delegate

> had been contacted by several of his constituents. They informed him that although the contractors that built their homes may have realized a power line may be built, the purchasers were not notified and purchased with the un-

derstanding that they were going to have a community with a certain appearance.

These statements indicate that some members of the general public were not aware that the line was under consideration. It is beyond the scope of this report to assess the reasons for this, or whether homeowners should have known about the proposed line. But the requirement that a utility use existing rights-of-way may help to ensure that persons who own property in areas away from existing easements will not unexpectedly suffer a potential decrease in property values. This issue would resurface in a later case in Fauquier, as discussed below.

As in Phase I, testimony was offered that indicated properties near the transmission line would be diminished in value. A paired sales analysis indicated a diminution of market value of 1 to 15 percent. Dominion offered rebuttal testimony, which indicated that there would be no impact on property values. One of Dominion's experts produced visual impact simulations and concluded that although the woods would be thinner for 50 to 100 feet, a tree buffer 300 to 500 feet thick would remain. The hearing examiner concluded that the simulations and residents' concerns over EMF risks indicate that there may be an impact on property values but that the tree buffer would greatly mitigate the impact.

In its final order, the commissioners appear to have considered the impact of the proposed and alternative routes upon property values. Although property values were not explicitly discussed, the commission did note the impact that various routes would have on the properties involved. As in earlier cases, the commissioners used a combination of routing and changes to pole heights and placements to mitigate impact. The final order did not discuss EMF, however, in contrast to the hearing examiner's report.

The Most Recent Case Rejected EMF Concerns and Suggested Homeowners Should Be More Aware of Planned Lines. In a 2004 case in Fauquier County, the issue of knowledge of a proposed line by property owners was used to counter claims that their property values would be unfairly diminished. In this case, Dominion filed an application in May 2004 for a new 500 kV transmission line, approximately eight miles long, which would be constructed entirely within existing right-of-way and paralleling an 500 kV line (2004-00062).

In filed comments, the Fauquier County Board of Supervisors indicated their concern that the proposed line would affect property values. The record reflects that many citizens filed comments, including information on the effect of EMF on health and the effect that the original line had upon property values at the time.

One witness provided some background about how the existing right-of-way was obtained. According to this witness, Dominion acquired its 235-foot wide easement in 1973 by instituting an eminent domain proceeding in the Circuit Court of Fauquier County (Virginia Electric and Power Company v. Danlon Associates, Et Al.) During this proceeding, the value of the 17.41 acres that would be condemned needed to be determined, as well as the extent of damages to the rest of the subdivision. In the condemnation proceeding, an expert witness testified that the value of the subdivision before the taking was $1,170,000, and after the taking it was valued at $598,441. It was also noted that EMF was not mentioned in the 1973 case and that the focus was on visual pollution.

SCC staff and Dominion stated that property owners had "been on notice" since the condemnation proceeding was filed in 1973. The fact that property owners should have known about the line was used as an indication that there would not be a new impact. Dominion pointed out that

> Virtually all of the 40 residents in Coventry purchased their properties after the existing line was built in the southern side of the right-of-way and could see that the northern side was open and could have checked the public records to determine the status of the open side. . . . The incremental impacts of the proposed new line were, or should have been, foreseeable by the residents in Coventry before they decided to live there, and are no different from those experienced by other landowners adjacent to transmission lines in other locations on the Company's system.

Dominion further argued that any property value impact of the new line was addressed in the condemnation proceeding, when the then-owner of the property was awarded damages for the right-of-way, "which included the right to construct not just the now existing line but additional lines as needed." Dominion added that the claims by current owners that the transmission line affects property values "are belied by the actual proximity of their residences to the existing and proposed lines." Noting that one resident of the subdivision recently acquired an additional property on the edge of the right-of-way, about 450 feet from the existing line, Dominion observed that "Clearly, impacts from proximity to the existing power line were not a deterrent to that transaction."

The hearing examiner appears to have agreed with Dominion's reasoning, noting that the homeowners "chose voluntarily to build next to a major transmission line corridor. In property law parlance, they moved to the nuisance." The hearing examiner also pointed out that the other alternatives considered by Dominion would require the acquisition or condemnation of additional rights-of-way, thereby affecting other property owners.

Unlike the cases in Loudoun County, in this case the potential effect on property values resulting from EMF was not included as a factor: the hearing examiner wrote that the vast majority of studies have not found a causal relationship between EMF and detrimental health effects. Instead, the hearing examiner stated that Dominion's offer to design and purchase vegetative buffers on the property of affected homeowners, as a result of clearing vegetation from the right-of-way, was "a reasonable response to the homeowners' concerns raised in this case."

The commissioners appear to have adopted the hearing examiner's reasoning, noting that alternative routes would require the acquisition or condemnation of additional rights-of-way, and that "based on the facts presented in this case, we find that the claims of EMF impacts were refuted by evidence presented by the Company." The commissioners also agreed with the hearing examiner that Dominion's offer to place vegetative buffers was a reasonable response, and directed the company to comply.

FEASIBILITY OF ALLOWING SURROUNDING PROPERTY OWNERS TO PAY FOR UNDERGROUND LINES IS LIMITED

In addition to an examination of property values, the mandate specifically calls for an analysis of "the feasibility of allowing surrounding property owners to agree to pay for the installation of underground lines."

There appear to be four broad issues to consider. First, the existing process used to certify transmission lines does not require the utility to provide cost estimates as part of the application, which may hinder an evaluation of the additional costs. Second, the route chosen for an underground line may not have a sufficient number of property owners to bear the costs. Third, anticipated increases in electricity rates may diminish the desire of ratepayers to incur the additional costs associated with undergrounding. Fourth, there appear to be some legal restrictions on the extent to which the most likely mechanism—a special tax assessment—can be used.

Obtaining Accurate Cost Estimates for Consideration by Surrounding Property Owners May Be Problematic

The property valuation literature and testimony in recent transmission line cases indicate that property values may be decreased by about 10 percent. As a result, it may be in the best financial interest of homeowners to pay for undergrounding if the cost of doing so is equal to or less than the cumulative decrease in property values.

A possible barrier to making this determination is the need for an accurate cost estimate of the overhead and underground alternatives. The party which is likely in the best position to make this determination is the utility, which may have staff with expertise in undergrounding or could use the services of an outside consultant as part of the necessary route selection process. Utilities are not required to submit this information, however.

The one utility in Virginia that has installed underground lines, Dominion, has maintained its opposition to the use of undergrounding, even if another party is willing to pay the costs. This does not indicate that underground lines could not be installed, however, if the commissioners order their use. As noted in the SCC's report *Implications of a Requirement to Consider Undergrounding of Electric Transmission Lines*, under the commission's Rules of Practice and Procedure any locality can request that the commission consider undergrounding by filing a notice of participation in a case as a respondent. The report also stated that the commission already has the authorization to condition approval of a transmission line upon the line being located underground.

Once this information is obtained, in some cases it may indicate that the additional cost of undergrounding a line exceeds the total decrease in property values. In the first Loudoun case (2001-00154), a public witness testified that the total decrease in property values (in a given area) would range from $1.5 million to $2.25 million. This potential decrease, while not insubstantial, is much less than the estimated cost of undergrounding. Dominion's pre-filed testimony indicated that an underground alternative would increase the cost from $10.2 million to $26.1 million.

Characteristics of the Property Affected May Affect Willingness or Ability to Pay

Leaving aside the matter of the actual cost of installing an underground line, the kinds of situations in which an underground line may be installed is an important factor. To date, underground lines have been approved by the SCC for relatively short distances, in dense urban settings, or where a submarine crossing of a water body is required. In those cases, existing rights-of-way were not suitable or were not available. However, where an existing right-of-way is available, it does not appear likely that homeowners would obtain much benefit from a new line being constructed overhead when an existing overhead line is present. Similarly, in situations where a new 230 kV line is proposed to occupy the same right-of-way as a future 500 kV line, undergrounding the smaller line may not be a satisfactory solution if the 500 kV line will be built overhead.

As a result, undergrounding will more likely be desirable in cases where new right-of-way is required. It is in these situations where an overhead line may be more intrusive if its installation requires clearing trees and is done in an area where other transmission lines are not and will not be present. The commissioners have not required the use of undergrounding in two cases where a historic site was affected by the line: the Sully Historic Site (1988-00042) and the Manassas Battlefield (1994-00036). However, the feasibility of allowing surrounding property owners to pay for undergrounding will likely depend, in part, upon the number of people affected by the newly cleared right-of-way, the value of their property, and other characteristics that may affect their willingness to pay for undergrounding.

In some parts of the State, property values may be sufficiently high that homeowners would be willing to pay for undergrounding. Even so, there would need to be a sufficiently large number of people affected, relative to the cost of undergrounding, for the additional payment to be desirable. It is on this point that past commission policies on routing a line may work against payment by surrounding property owners.

The commissioners have indicated a desire to route lines such that they come close to as few houses as possible. To this end, the staff guidelines request information on the number of houses that will be within 500 feet of a line. If this routing is successful, the number of nearby property owners is decreased. The chosen route may also pass through a mix of neighborhoods: some with relatively high home values or personal income, others with relatively less. As a result, some homeowners may not find the additional expenses to be affordable or reasonable.

Transmission lines that are routed in part through industrial or commercial areas may be less intrusive, and property owners in those areas may not desire undergrounding. A "hybrid" line, one that is partially overhead and partially underground, may be offered as a solution in these cases but this type of approach would require that a 7,500 square foot parcel of land be available for transition structures, where an underground line is connected to overhead towers.

Anticipated Increase in Electricity Rates May Affect Ability to Pay

Relatively low electricity rates in Virginia result from the rate caps implemented as part of the Virginia Electric Utility Restructuring

Act. Rates have been capped since 1998, and apart from annual adjustments for the cost of fuel beginning in July 2007 customers of Dominion Virginia Power will not see an increase in overall electricity rates through 2010 under current law. Yet these increases—and the market prices that will follow the expiration of rate caps—may be sufficient to limit the willingness of some property owners to incur additional costs.

The SCC is of the opinion that electricity prices will likely increase. According to the latest status report by the SCC, *The Development of a Competitive Retail Market for Electric Generation within the Commonwealth of Virginia*, "Virginia retail customers could see precipitous increases in their electric bills" prior to the expiration of capped rates on January 1, 2011. Moreover, the SCC warns that "post rate cap prices could be significantly higher than today's capped rate levels." An increase in electricity prices may be especially challenging for some older Virginians.

In contrast, Dominion notes that "the SCC's opinion that post-capped rate prices will be precipitously higher is not a universally held view." Dominion refers to the benefits of well-functioning competitive markets and argues that despite high electricity prices (which are driven by high fuel costs), robust competition will continue to benefit consumers, especially if policy makers continue to support an effective restructuring process.

Statutory Restrictions May Hinder the Use of Special Assessments as a Mechanism

If cost estimates could be obtained and public support warranted such an investment, then the locality would have to observe certain legal requirements. One mechanism that may be used is for the locality to levy a special assessment. Authority for the creation of these assessments is found in Sections 15.2-2404 – 15.2-2413 of the *Code of Virginia*, and Article X, Section 3 of the *Constitution of Virginia*. A key feature of this mechanism is that the cost of a project is borne by those who benefit from it. Procedurally, these districts are created after a petition by a majority of the landowners in the proposed district (60 percent in counties; 75 percent in cities) or by a two-thirds vote of the governing body.

Section 15.2-2404 specifies the improvements for which assessments may be levied: sidewalks, paving existing alleys, sanitary or storm water management facilities, retaining walls, curbs, gutters, waterlines, street lights, canopies, benches, waste receptacles, and "permanent amenities." Additional types of improvements are allowed in specific localities, including the installation of underground transmission lines in Loudoun County.

Because these assessments produce a revenue stream that may need to be collected over many years, an underground project may require an additional form of financing, such as the issuance of a bond, to pay for up-front costs of the project. If this is the case, the resulting bond issues would be moral obligation, and hence could be more difficult to market and may carry a marginally higher interest rate than general obligation bonds. In some localities, these issues may count against the locality's debt capacity ceiling. JLARC staff inquired about these concerns with local development officials and were informed that a bond attorney would need to be consulted about any specific project.

Two aspects of current law that may prove problematic to the feasibility of this approach are the statutory requirements that these assessments be made only on "abutting" landowners and that the assessments "shall not be in excess of the peculiar benefits resulting from the improvements" (Section 15.2-2404). There is a constitutional basis for these restrictions: Article X, Section 3 of the *Constitution of Virginia* provides that

> The General Assembly by general law may authorize any county, city, town, or regional government to impose taxes or assessments upon abutting property owners for such local public improvements as may be designated by the General Assembly; however, such taxes or assessments shall not be in excess of the peculiar benefits resulting from the improvements to such abutting property owners [emphasis added].

According to bond attorneys contacted by JLARC staff, these requirements may mean that specific measures of cost and benefit be used, such as increases in property value.

There are also statutory limits on the amount that can be funded through these assessments in cities and towns. The assessment may not exceed 50 percent of the total cost in cities or towns (unless otherwise agreed) with certain exceptions based on population thresholds (Section 15.2-2406). Moreover, the other 50 percent of the cost would have to be obtained by other means.

Chapter

9 The State's Role in Approving Transmission Lines May Diminish in the Future

In Summary

Dominion, like other utilities, is planning several new transmission lines. These lines are designed to respond to projected increases in the demand for electricity and also to ensure the reliability of the transmission grid. Some of the new projects planned by Dominion indicate that the company uses several methods other than building new lines to respond to load growth and reliability concerns. Moreover, some of the plans suggest that overhead lines may allow for greater flexibility than underground lines. One aspect of future transmission lines that may differ from those approved and built in the past is the increasing focus on regional planning. As required by the Virginia Restructuring Act, Dominion is a member of a regional transmission organization. This organization has identified new lines in Virginia that it states must be built in order to ensure the operation of the regional grid. This change raises questions about the extent to which undergrounding or other forms of mitigation will be used. In addition, one of these lines may be the first instance of a new federal approval process, whereby lines that are deemed to be of national importance are approved by federal authorities rather than the SCC.

Like other utilities, Dominion is planning to build several new transmission lines. The October 2006 Long-Term Reliability Assessment published by the North American Electric Reliability Council (NERC) indicates that utilities in the southern part of the U.S., including Virginia, plan on adding 1,624 miles of 230 kV, 270 miles of 345 kV, and 345 miles of 500 kV transmission lines in the 2006–2015 time period. This equates to more than $6.75 billion in expenditures over the next five years. In Virginia and North Carolina specifically, planned transmission additions include 647 miles of 230 kV lines and 105 miles of 500 kV lines.

The role of the SCC in approving some of these new lines, particularly at the 500 kV level, may change as a result of recent federal legislation that would allow the Federal Energy Regulatory Commission (FERC) to designate certain future transmission lines as being of national importance. One such line has been proposed in Northern Virginia, and if it is designated as a National Interest Electric Transmission Corridor (NIETC), then State control could cease 12 months after either this designation or after the case is filed with the SCC.

DOMINION'S LONG-RANGE PLAN ANTICIPATES MANY NEW TRANSMISSION LINES

Dominion updates its *Electric Transmission Long Term Plan* annually and posts portions of it on the company's website. Information about Dominion's plans may also be found in PJM's Regional Transmission Expansion Plan, as discussed below. According to the information in these public documents, Dominion plans many new transmission lines over the next 17 years, primarily in Northern Virginia and Hampton Roads/Southside. Information on these lines is presented in Table 17 and Figure 15.

Although new transmission line are planned, Dominion's plan indicates that it accommodates load growth by several means. In some cases, new lines can be avoided or delayed by improving (uprating) existing lines. Improvements to a line in Chesterfield County, combined with the addition of a second line to existing

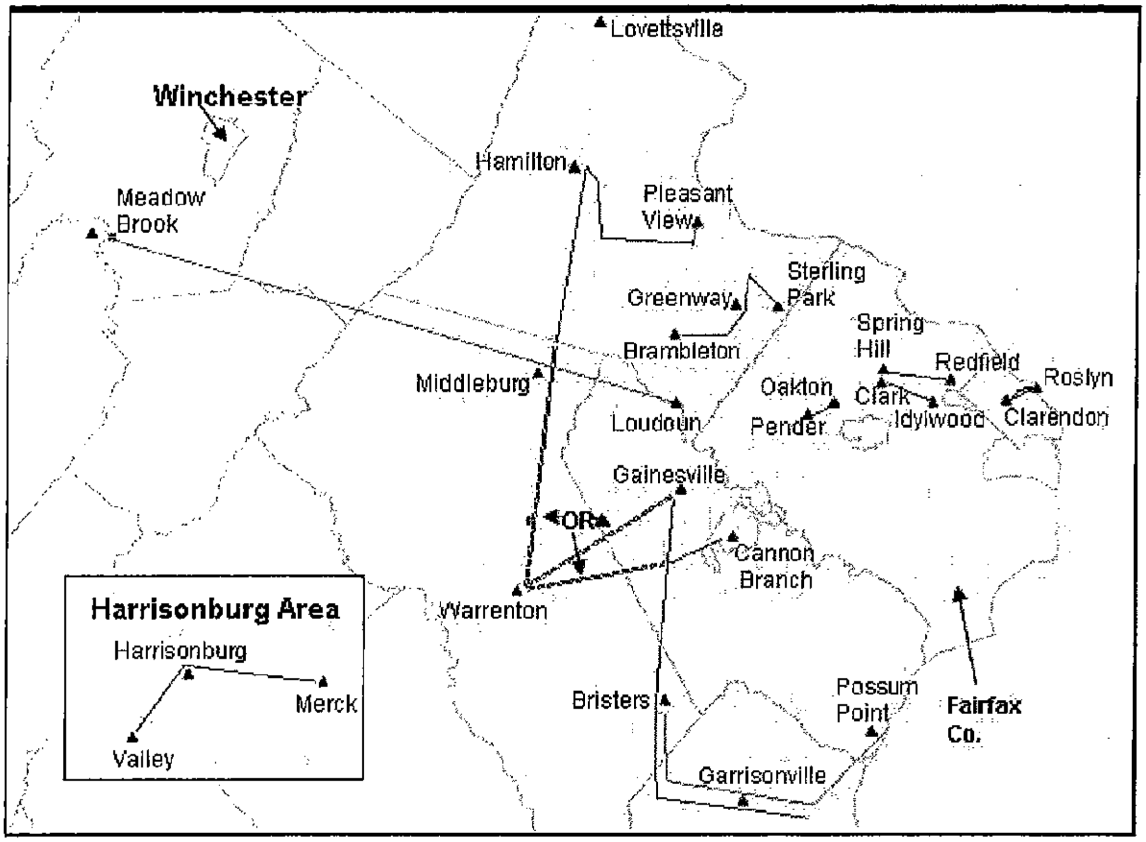
Table 17: Dominion's Long Range Plan Lists New Transmission Lines Statewide

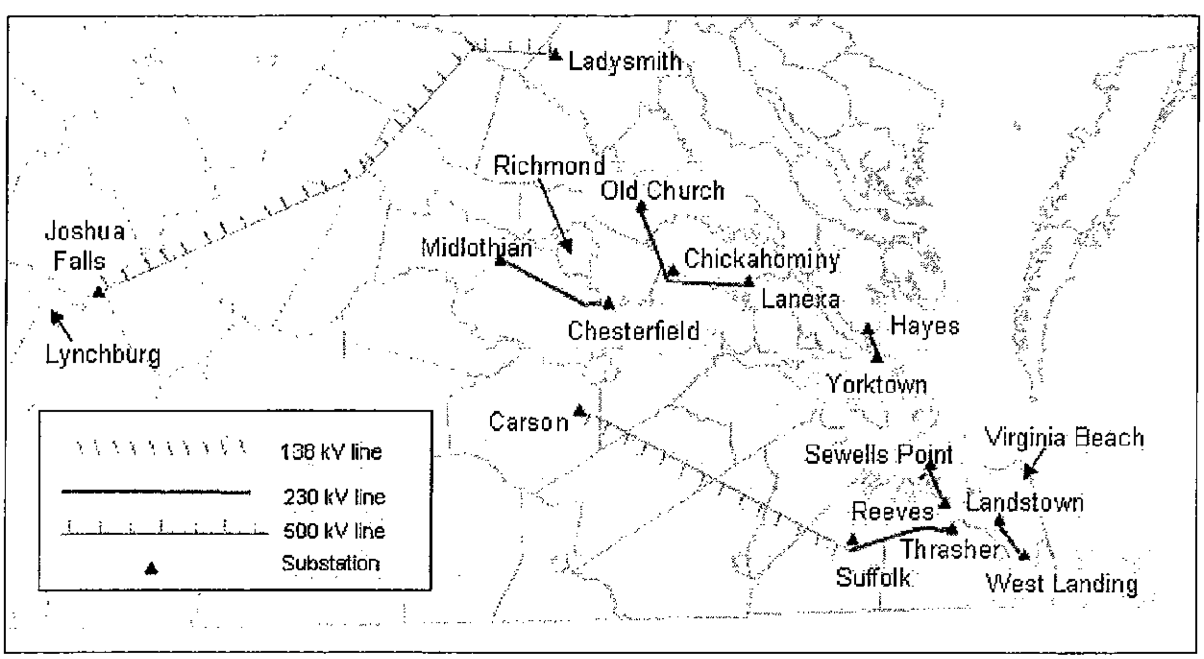
Substation (Locality)–Substation (Locality)	Voltage	Planned Date
Landstown (Virginia Beach)–West Landing (Virginia Beach)	**230**	**2007**
Clarendon (Arlington)–Rosslyn (Arlington)–Ballston (Arlington)	69 & 230	2008
Brambleton (Loudoun)–Greenway (Loudoun)	**230**	**2008**
Pleasant View (Loudoun)–Hamilton (Loudoun)	230	2008
Old Church (Hanover)–Chickahominy (Charles City)	**230**	**2009**
Bristers (Fauquier)–Gainesville (Prince William)	*230*	*2009*
Garrisonville (Stafford) loop line	230	2009
Harrisonburg (Rockingham)–Valley (Augusta)	*230*	*2010*
Suffolk (Suffolk)–Thrasher (Chesapeake)	230	2011
Carson (Dinwiddie)–Suffolk (Suffolk)	500	2011
Chickahominy (Charles City)–Lanexa (New Kent)	230	2011
Bristers (Fauquier)–Garrisonville (Stafford)	230	2011
Meadow Brook (Shenandoah)–Loudoun (Loudoun)	500	2011
Harrisonburg (Rockingham)–Merck (Rockingham)	230	2012
Hayes (Gloucester)–Yorktown (York)	230	2012
Pender (Fairfax)–Oakton (Fairfax)	**230**	**2014**
Midlothian (Chesterfield)–Chesterfield (Chesterfield)	*230*	*2015*
Clark (Fairfax)–Idlywood (Fairfax)	*230*	*2015*
Reeves (Norfolk)–Sewells Point (Norfolk)	230	2015
Bristers (Fauquier)–Possum Point (Prince William)	500	2016
Joushua Falls (Amherst)–Ladysmith (Hanover)	500	2016
Brambleton (Loudoun)–Sterling Park (Loudoun)	230	2018
Bristers (Fauquier)–Cannon Branch (Manassas)	230	2019
Middleburg (Loudoun)–Hamilton (Loudoun)	230	2020
Hamilton (Loudoun)–Lovettsville (Loudoun)	138	2022
Warrenton (Fauquier) networking alternatives	230	2023
Redfield (Fairfax)–Spring Hill (Fairfax)	230	2023

Notes: Lines in **bold** have already been approved by the SCC. Lines in *italics* are proposed for installation on existing overhead towers.

Source: Dominion Electric Transmission Long Term Plan, October 2006. http://www.dom.com/about/elec-transmission/

Figure 15: Transmission Lines Planned By Dominion in Northern Virginia (Top Map) and Southside and Hampton Roads (Bottom Map)





Note: Transmission line routes illustrate the locations to be connected, not the actual route.

Source: JLARC staff analysis of Dominion's October 2006 Electric Transmission Long Term Plan.

towers, will meet load growth in Chesterfield without having to acquire new right-of-way. Similarly, by improving a 230 kV line that runs from Chuckatuck to Newport News, Dominion can avoid building a new 500 kV line from Chickahominy to Williamsburg (Skiffes Creek).

In other situations, a new project will accommodate load in one area, thereby delaying the need for a project in a second area. For example, the proposed Hamilton substation in central Loudoun County will take some of the load now served by the Middleburg substation, possibly delaying the need for new transmission projects in the Middleburg area.

Projects included in the plan also suggest that overhead construction provides more flexibility than undergrounding. For at least three new transmission line projects (indicated in Table 17 by italics), Dominion proposes to add a second line to existing transmission towers. To achieve the same result on an underground line, during initial construction a second trench would be required and pipes or a ductbank would need to be installed. In at least two other cases listed in Table 17, a portion of the line can be placed on existing structures, although new right-of-way will be needed for the remainder.

Interstate considerations also affect local transmission planning. Projects planned for Northern Virginia are affected by the fact that some of the 230 and 500 kV transmission lines in that area are used to import and export power.

Interstate considerations also affect local transmission planning. Projects planned for Northern Virginia are affected by the fact that some of the 230 and 500 kV transmission lines in that area are used to import and export power. When a new project is proposed, Dominion gives consideration to whether it would affect power flows between Virginia and other states. In addition, planners look at whether a project built for **intrastate** distribution or transmission needs could also accommodate **interstate** needs. As a result, power flows have affected the types of alternatives proposed by Dominion. For example, construction of the Pleasant View-Hamilton line is intended to be the first step in creating a 230 kV network that runs south to Middleburg and then east to Loudoun. This network is needed in order to reduce power flows on the existing corridor from Loudoun to Pleasant View, which is used for interstate power imports and exports in addition to supplying local distribution needs. Power is imported into Northern Virginia because the region does not generate enough power to meet demand.

REGIONAL PLANNING AND THE FEDERAL ENERGY POLICY ACT MAY CHANGE THE ROLE OF THE SCC

The role of the SCC and the Commonwealth in general in regulating electric utilities is changing, and this could affect the process used by the SCC in all transmission line siting cases. The role of the SCC began to change with the passage of the Virginia Electric

Utilities Restructuring Act in 1999, which had two pertinent changes: utilities were required to allow other electricity generators to use their transmission lines, and the utilities were required to join a regional transmission organization (RTO). More recently, the passage of the federal Energy Policy Act of 2005 altered the incentives and requirements for the transmission grid.

The restructuring act required Virginia's utilities to join an RTO in order to ensure the success of deregulation. The RTOs are overseen by FERC and are designed to allow for a regional approach to transmission operating, planning, and investment. This is accomplished in part by having the RTO manage the daily operation of each utility's transmission lines, including the setting of rates for the transfer of wholesale power between utilities. Virginia's largest utilities decided to join an RTO known as PJM, which is located in the mid-Atlantic area. Electric utilities in several other states are also members of PJM.

PJM's Regional Transmission Line Planning Has Identified the Need for Several New Lines in Virginia

As a result of FERC's encouragement of RTOs and Virginia's requirement that its utilities join an RTO, the role of the SCC appears to be changing. This may be seen in part by looking at the role that PJM plays in planning for new transmission lines. One of the activities undertaken by PJM is its Regional Transmission Expansion Planning Process (RTEP), which will likely result in increased transmission construction in future years. As noted in PJM's 2006 RTEP, the electricity needs of customers in New Jersey, Delaware, eastern Pennsylvania and Maryland (including Baltimore and Washington, D.C.) are supplied in part by wholesale power transfers along interstate extra-high voltage (EHV) lines in Northern Virginia, northern West Virginia, western Maryland, eastern Ohio and southwestern Pennsylvania. These growing transfers "are driving the need for transmission upgrades" which PJM is responsible for addressing.

A review of Dominion's planned transmission lines indicates that several projects in the northern part of Virginia are identified as resulting from, or being affected by, transmission needs outside of Virginia. Dominion's plan indicates that several projects (such as transmission lines or transformers) are included in PJM's regional plan. Of the 124 projects in Dominion's plan, 18 are required by PJM. However, it is not clear whether these regional considerations will affect the role of the SCC or its decisions.

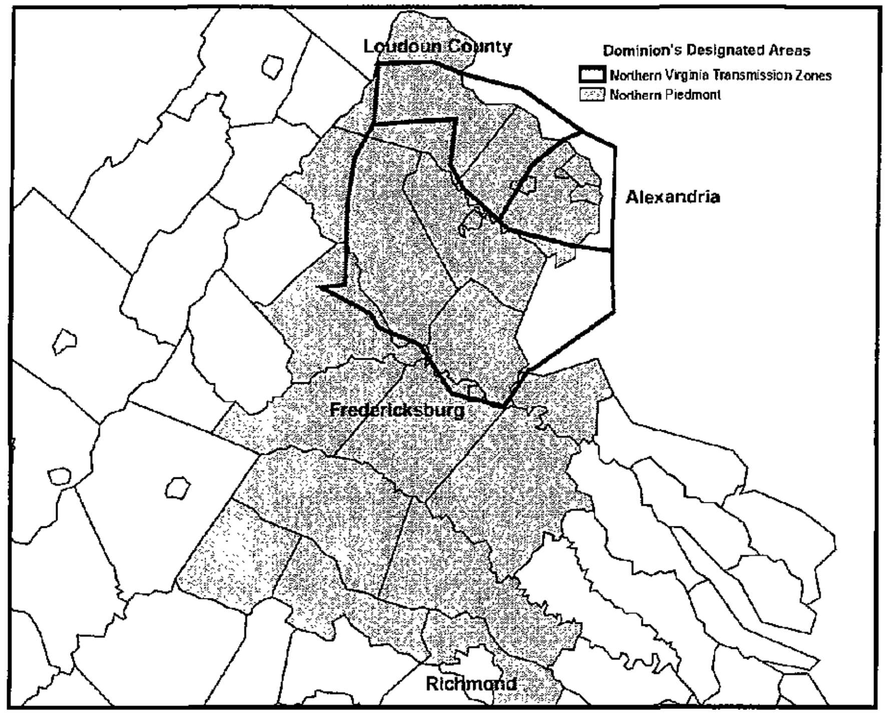
The results of this regional approach to transmission line planning may be seen in two recently announced projects, and an apparently unannounced project, which appear to be designed to address regional needs:

- The 230 kV Bristers-Gainesville line, running for 16 miles between Fauquier and Prince William Counties, and associated substations will help alleviate stress "on the critical EHV interfaces north of Pleasant View substation." These stresses are caused in part by a new wind farm in West Virginia. Dominion filed an application for certification of this line in May 2006 (2006-00048).
- New lines near Harrisonburg, such as the 230 kV Harrisonburg-Valley line, will also be needed in part because of "heavy west to east transfers across the EHV interfaces to the north."
- The 500 kV Meadow Brook-Loudoun line is proposed as a solution to contingency analyses which indicate that lines in West Virginia and Maryland could overload under certain conditions. Dominion's responsibility consists of 30 miles between the termination of Allegheny Power's responsibility in Frederick County and Dominion's substation in southeastern Loudoun County.

Dominion states that these lines, including the Meadow Brook-Loudoun line, are needed to ensure the reliable delivery of electricity to Virginia consumers. According to the company, Northern Virginia will face severe reliability problems by 2011 if these lines are not built. This results in part from the fact that power must be imported into Northern Virginia because it is "generation deficient." Specifically, in Dominion's three Northern Virginia transmission zones (illustrated in Figure 16), peak load in the summer of 2007 is expected to be 6,031 megawatts, but generation within this area is expected to be only 2,926 megawatts. Additionally, Dominion states that electrical demand in Northern Virginia has grown by 40 percent in the past ten years and is expected to grow an additional eight percent by 2011.

However, the regional or multi-state nature of these lines may be seen in the fact that PJM's proposals to FERC indicate that Dominion may recover most project costs from other utilities. This allocation, however, is currently before FERC and has not yet been endorsed by that body. As required by Schedule 6 of PJM's Operating Agreement (Section 1.5.6), PJM allocates cost responsibility for a transmission line based on the extent to which load in one or more utility service areas (such as Dominion's) causes the need for the upgrade. This cost assignment is necessary, according to PJM, because "in a large, integrated transmission system such as PJM, demand in one area can and does contribute significantly to congestion and overloads on facilities in other areas." PJM notes

Figure 16: Location of Dominion's Northern Virginia Transmission Zones and its Northern Piedmont Region



Source: JLARC staff.

that the allocations "are a reasonable approximation of the long-term benefits of the upgrades." In contrast, the costs for Dominion's planned 500 kV line across southern Virginia, from Dinwiddie County to the City of Suffolk, is currently assigned completely to Dominion. The cost allocations for these lines are listed in Table 18.

It is important to note that a line which is built to relieve congestion or address regional reliability concerns may also improve Dominion's overall system reliability in Virginia by providing alternate pathways on which power can flow. JLARC staff asked whether the proposed Bristers-Gainesville line serves this purpose, given that PJM has assigned the costs to other utilities. Dominion staff indicated that the utility still needs the line to serve its load in Northern Virginia, even if this load is smaller relative to the load that will be served in other states. Dominion staff also pointed to the fact that the line was originally included in their 2005 long-term plan. This plan, which was issued in October 2005, does include the line. The October 2004 plan, published before Dominion joined PJM in May 2005, does not.

Table 18: PJM's Preliminary Recommended Cost Allocations for Planned Transmission Lines in Virginia

Utility	Planned Transmission Line			
	Meadow Brook-Loudoun	Harrisonburg-Valley	Bristers-Gainesville	Carson-Suffolk
Atlantic City Electric	4	2	4	0
Allegheny Power	0	20	3	0
Baltimore Gas and Electric	19	8	17	0
Delmarva Power and Light	6	3	6	0
Dominion	**0**	**33**	**0**	**100**
Jersey Central Power & Light	9	5	9	0
Metropolitan Edison	4	2	4	0
Long Island Power Authority	1	0	1	0
PECO Energy	12	6	12	0
Pennsylvania Electric	1	1	2	0
Potomac Electric Power	21	8	19	0
PPL Electric Utilities	9	5	9	0
Public Service Electric & Gas	14	7	13	0
Rockland Electric	0	0	1	0

Source: JLARC staff analysis of material submitted by PJM to FERC, and presentations by PJM's Transmission Expansion Advisory Committee.

Although SCC staff noted that the Bristers-Gainesville line is the first Dominion project submitted to the SCC that has been authorized by PJM, the staff report in this case did not discuss the relationship between the needs identified by PJM and those identified by Dominion. As noted by SCC staff, Dominion's application stated that the proposed line is needed in order to continue to provide reliable service within its Northern Piedmont region (Figure 16), which includes 20 localities. SCC staff observe that "the proposed line would deliver power into Prince William County, which lies at the edge of the Washington, D C. metropolitan area, and is experiencing rapid business and residential development." The SCC staff report, like Dominion's application, was silent on the multi-state need for the line.

If these changes alter the role of the SCC, they may also affect the use of undergrounding. It would not be unusual if undergrounding was proposed for these lines during the transmission line proceedings before the SCC. The more likely scenario, if these line are approved, is that some alternative form of mitigation will be required, such as the maintenance of a tree buffer or changes to the proposed towers. A question therefore arises as to whether Dominion will be required to pay for undergrounding or any other type of mitigation effort if a project's costs are borne by utilities outside Virginia. In response to this question, the commissioners informed JLARC staff that "any requirements placed by the Commission on a certificate of public convenience and necessity, in the form of conditions or otherwise, must be met by the applicant."

Under State law, the SCC retains the authority to certify all new transmission lines proposed for construction in Virginia. The exact nature of how the SCC's certification process may change, if at all, as a result of PJM's planning process is not yet known. PJM is making several changes to the RTEP process, which will now be done over a 15-year horizon, and will result in "a new level of approval which will require the affected Transmission Owners to proceed with preliminary siting, environmental impact assessment, and potential right-of-way acquisition." Consequently, as planning shifts in part to a regional process, local or State agencies in Virginia may not be involved in the designation of transmission line corridors or in a discussion of the appropriate technology. Of note, a review of membership lists for the two PJM groups most closely involved in developing the RTEP indicates that the only members from Virginia are utilities. In contrast, both Pennsylvania and the District of Columbia have government representation.

Local and State agencies may benefit from greater participation in PJM's planning process, in order to voice concerns or advocate for certain projects. In some cases, the shift to a regional process may mean that local and State agencies may need to participate in proceedings before FERC. For example, several members of PJM have questioned the assumptions used by PJM to approve certain transmission lines, and the resultant cost allocations. Among the projects questioned by other utilities is the proposed Meadow Brook-Loudoun line. For example,

- Public Service Electric & Gas (PSEG) of New Jersey argues that "PJM has made certain planning assumptions, which we contend are flawed. For example, PJM's long-term portion of the plan does not properly consider what new generation resources or demand side resources will be in place in those later years." PSEG then pointed to five specific issues in the process used to approve several projects, including the Meadow Brook-Loudoun line, noting: "In some instances, changes to even one of these items could alleviate the need for one or more of these projects."
- The Long Island Power Authority specifically questioned the Meadow Brook-Loudoun line, noting that it echoed concerns similar to those raised by other stakeholders "regarding the sufficiency of analysis and justification" for this project. One concern identified was that "PJM has not described whether less costly alternatives to the projects were considered, and, if so, provided any background information and explanations as to why the alternative projects have been rejected."
- FirstEnergy made more general comments about the RTEP. (FirstEnergy includes Jersey Central, Met-Ed, Ohio Edison,

Penelec, and Penn Power.) FirstEnergy asked for additional explanation as to why the projects are needed, and why the alternatives were discarded. FirstEnergy noted that it "does not dispute the fact that the proposed RTEP projects will resolve the [reliability] criteria violations identified. [But that the] issue is whether they 'all' are required to meet the long term security goals of the transmission system."

Changing Authority of Federal Regulators May Affect the SCC's Role

Under a federal law passed in 2005, a federal entity (FERC) can designate national interest electric transmission corridors, and potentially supersede State regulators in approving transmission projects in these corridors.

The passage of the federal Energy Policy Act of 2005 (EPAct) allows FERC to designate any geographic area experiencing electric energy transmission capacity constraints as a national interest electric transmission corridor (NIETC). According to the language of Section 1221, FERC would then have "backstop" authority to issue permits for construction of transmission lines in the NIETC if

- the State does not have authority to approve the facilities or to consider interstate benefits of the facilities;
- the applicant does not qualify to apply to the State for construction authority;
- the State has withheld approval for more than one year after the filing of an application seeking approval or one year after the designation of the NIETC, whichever is later; and
- the State has conditioned its approval in such a manner that the proposed construction will not significantly reduce transmission congestion in interstate commerce or is not economically feasible.

FERC's authority includes the ability to grant utilities the power of eminent domain along the route. States may be able to forestall FERC siting authority by forming regional siting compacts, which has been the subject of discussion by the National Governors Association.

The designation of NIETCs appears to be attractive to utilities as a means of lowering state regulatory barriers. For example, a New York company has proposed a privately financed 200-mile transmission line, and has asked FERC to designate its proposed route as a NIETC even though it does not cross a state boundary. Dominion provided formal comments to FERC on the EPAct, including the use of NIETCs, and the comments indicate a desire to bypass the SCC's authority:

> We applaud the section of the Federal Energy Policy Act of 2005 giving the FERC backstop authority over transmission

> siting. The process today involves costly and time-consuming reviews by multiple county, city and state agencies. While it would have been preferable to give the FERC the same authority it now holds in the siting of gas transmission facilities, the backstop provisions of the new Energy Policy Act are a good step forward. We also applaud the Act's efforts to set enforceable federal reliability standards for the transmission grid and to encourage investment in transmission facilities . . . .

One of the two Virginia utilities responsible for constructing the Meadow Brook-Loudoun line, Allegheny Power, has indicated its desire to seek NIETC designation:

> Construction of over 200 miles of 500 kV line from 502 Junction to Loudoun within 5 years calls for an extremely aggressive schedule. . . . AP urges PJM to . . . work with AP to obtain any necessary NIETC designation for this project from DOE.

Dominion has not requested this designation.

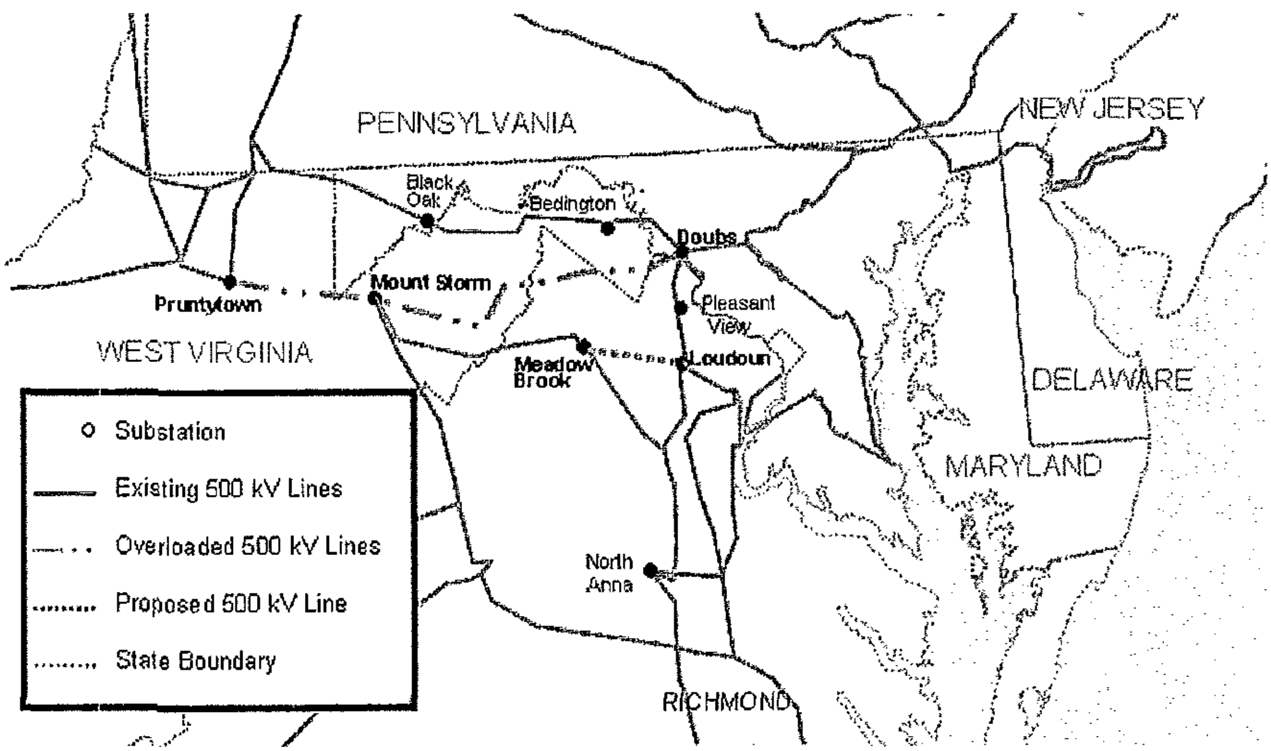
The indication that this line serves interstate needs, although it will likely strengthen Virginia's grid as well, is indicated in PJM documentation of the need for the line, which will be built to address reliability issues (contingencies) on transmission lines in West Virginia and Maryland (Figure 17):

> The recommended solution to the Mt. Storm-Doubs 500 kV and Pruntytown-Mt. Storm 500 kV overloads is to build a new 502 Junction-Mt. Storm-Meadow Brook-Loudoun 500 kV circuit. The cost is estimated at $850 million with a June 2011 in-service date.

As noted above, the electricity needs of customers in New Jersey, Delaware, eastern Pennsylvania and Maryland (including Baltimore and Washington, D.C.) are supplied in part by interstate transmission lines. However, these needs are also supplied by local generation, and the likely retirement of these generating plants may lead to the need for additional interstate lines. This can already be seen in the case of the potential closure of Mirant's Potomac River generating plant in Alexandria. According to PJM,

> Shutting down Potomac River of itself imposes additional contingency loading on the Bedington-Black Oak and Mt. Storm-Doubs 500 kV transmission lines, exacerbating the constraints already experienced on those lines.

Figure 17: New Transmission Line in Virginia Proposed to Address Overloaded Lines in West Virginia



Source: JLARC staff analysis.

PJM indicates that the closure of this plant alone could advance the date by which the Meadow Brook-Loudoun line (or another alternative) is needed by as much as two years. This is a further indication of the value of regional cooperation among Virginia localities in the siting of not just transmission lines, but generating plants as well.

As indicated earlier, the commissioners have stated that the utility applying for a line would be responsible for meeting any requirements ordered by the commission. Although it is unlikely that a 500 kV line, such as the Meadow Brook-Loudoun line, would be undergrounded, as technology advances it is not inconceivable that this may become possible. As noted in Chapter 2, a 26-mile 500 kV line has been installed in Japan. Therefore, the manner in which the Meadow Brook-Loudoun line is approved may serve as an important precedent.

JLARC staff asked the commissioners how they anticipate that the designation of any NIETCs in Virginia will affect their current role in transmission siting. In response, the commissioners indicated that under Virginia statutes, the commission is required to find that the new line is needed and that in previous cases applicants "have provided evidence to show that the new lines are necessary to provide reliable **intrastate** service to Virginia consumers" [emphasis added]. The commissioners added that although they have "not considered interstate needs to be dispositive in applying Virginia statutes on this matter," evidence could be introduced that establishes a proposed **interstate** line's "overall system benefits."

The commissioners also provided information as to the steps that are necessary in a transmission line case in order to afford due process, noting that "it is not unusual for more than 12 months to pass prior to reaching a final resolution in complex transmission line proceedings before the Commission." As indicated in Table 19, for cases filed in the past five years, Dominion has sought approval between six and 23 months prior to the date by which the company needed to begin construction. For example, the Morrisville-Bristers 500 kV line (2004-00062), which is being built on existing right-of-way, was filed in May 2004. Dominion's application indicated that construction would take 24 months, and that the line needed to be complete by May 2007. This indicates that approval was needed by May 2005, or 12 months after the case was filed.

Lastly, the commissioners stated that they will continue to fulfill their statutory obligations and will continue to provide the public participation and analyses directed by Virginia statutes, but that they "obviously cannot speak as to how FERC, or applicants before the Commission, may attempt to invoke the new federal permit provisions contained in EPAct 2005."

Dominion expressed confidence that "the State Corporation Commission will deal with this case [Meadow Brook-Loudoun] in a fair and impartial manner, carefully considering all issues and concerns raised during the review process." In addition, Dominion feels that "the Commission's record of fair and impartial consideration of transmission cases makes uncertain the relevance of the NIETC designations and FERC backstop siting authority to Virginia."

Table 19: In Recent Cases, Dominion Has Filed An Application Between Six and 23 Months Prior to the Anticipated Construction Date

Case Number	Date Filed With SCC	Date Line Needs To Be Completed	Construction Time (Months)	Anticipated Construction Date[a]	Date Approved by SCC
2001-00154	March 2001	May 2002	6	Nov. 2001	June 2003[b]
2002-00702	Dec. 2002	May 2005	8	Sept. 2004	Oct. 2004
2003-00064	Feb. 2003	June 2005	18	Dec. 2003	Oct. 2003
2004-00041	April 2004	Nov. 2006	8	March 2006	Sept. 2004
2004-00062	May 2004	May 2007	24	May 2005	July 2005
2004-00139	Dec. 2004	May 2007	24	May 2005	Aug. 2005
2005-00018	April 2005	June 2008	12[c]	June 2007	Pending
2006-00048	May 2006	May 2009	24	May 2007	Pending
2006-00091	Aug. 2006	June 2009	24	June 2007	Pending

[a] Completion date minus construction time.
[b] Final order issued in June 2002 granted approval but remanded the case to determine specific placement of transmission towers.
[c] Also requires 24 months for preconstruction activities (right-of-way acquisition and clearance, and additional permitting).

Source: JLARC staff analysis of transmission line cases.

Chapter 10 Need for Improved Information Availability and Planning in Transmission Line Cases

In Summary

In the past, underground transmission lines have accounted for a very low proportion of transmission lines in the United States and Virginia. However, some experts indicate that in the future, greater use of underground transmission lines may be seen for several reasons, including increasing difficulties in finding appropriate right-of-way for overhead lines. This may be especially true in areas that are densely populated and that have high land values.

A review of prior transmission cases in Virginia indicates that improvements could be made in the availability of information and planning. Presently, there is little coordination of planning activities between Virginia's local governments and Dominion. In some cases, a consequence is that lines may be built underground because of rapid and uncoordinated development. In other cases, a surprised public may oppose a new overhead line and advocate undergrounding, while lacking good information about the factors involved. Moreover, even if surrounding property owners were able to pay for undergrounding, the present lack of coordination limits the feasibility of this option.

Some information that may have affect policymaking, and the SCC's review of transmission lines, is not presently available to the SCC, local and State agencies, or the general public. This information includes electric utility industry reports on the latest research into undergrounding and the software required to confirm that a new transmission line is needed. The lack of this information affects the hearing process used by the SCC because some parties are at a disadvantage when a transmission line is proposed and potentially operate with an information deficit during the adversarial proceedings before the SCC. In light of these concerns, JLARC staff recommend statutory amendments that may improve policymaking and the SCC's review of transmission lines.

There are also existing limitations in the process used to plan transmission lines, namely a lack of coordination between utilities and local governments. Some of the existing underground lines were built because rapid growth at the local level eliminated previously available overhead transmission routes. Improvements to this process could help ensure that undergrounding is used appropriately.

LIMITED ACCESS TO INFORMATION HAS IMPORTANT POLICY IMPLICATIONS

JLARC staff encountered difficulty obtaining certain information that may have proved useful during this review. As discussed in Chapter 1, some of this information was unavailable because it can only be obtained by utilities. In other instances, Dominion declined to provide requested information due to concerns that information it deems confidential could subsequently be requested from JLARC under Virginia's Freedom of Information Act (FOIA).

A larger consideration, however, is the policy implications resulting from the lack of information available to SCC staff, local governments, or the general public regarding undergrounding specifically and transmission line planning generally. Utilities and their membership organizations have access to a much larger array of information and expertise than other organizations. At present, the SCC does not have access to this information, although it may be eligible for membership in some of the organizations. Local governments and property owners would likely have much more difficulty obtaining this information, and some consultants contacted by JLARC staff indicated they are disinclined to work for anyone other than a utility.

Additionally, SCC staff presently do not have routine access to information that would allow them to analyze the factors used by a utility to indicate the need for a transmission line—or that undergrounding is not feasible in certain instances.

Certain Information Was Restricted by Dominion Because of Concerns It Could Become Publicly Available

Although Dominion staff provided a great deal of information during this review, certain data requested by JLARC staff were not provided, and Dominion staff cited confidentiality concerns. Specifically, Dominion was concerned that the exemption for JLARC in Virginia's FOIA would not prohibit the release of confidential data, and their general counsel suggested that the exemption reflect the wording in Chapter 132-1.2 of the *North Carolina General Statutes*.

For example, JLARC staff requested information at the substation level on projected increases in demand, in order to determine where future lines may need to be built and if the locations may be suitable for undergrounding. Dominion declined to provide this information, instead providing information for large regions of Virginia. Dominion staff noted that the release of detailed information may aid their competitors who would then be better able to determine where a generating facility should be located, or could breech agreements Dominion has on non-disclosure of electricity consumption by certain parties.

JLARC staff also explored the use of Dominion's geographic information system (GIS) data to answer the mandate's question regarding the impact of transmission lines on property values. Dominion again declined to provide this information because of FOIA. JLARC staff instead used information available from State agencies, local governments, and other published information. The accuracy of the GIS information created by parties other than Dominion is not known, and time constraints also prevented a complete analysis of the potential impact on property values. A more complete analysis could be conducted if there is legislative interest, and this would be aided by the use of the GIS information maintained by Dominion if their confidentiality concerns can be addressed.

Recommendation (1). The General Assembly may wish to amend Section 2.2-3705.3 of the *Code of Virginia* to include confidential proprietary business data, records, and other information provided to the Joint Legislative Audit and Review Commission pursuant to a study or investigation as exempt from disclosure either during or after the completion of a study or investigation.

Greater Access to Information May Benefit SCC Staff During Reviews

SCC staff play a very valuable role during transmission line cases. Staff have analyzed utility applications and suggested alternate routes and other modifications. Staff also provide information in response to questions from the hearing examiner and in some cases produce staff reports. The role of staff could be augmented by ensuring that they have routine access to certain types of information.

SCC Does Not Appear to Use Industry Reports on Undergrounding. The Electric Power Research Institute (EPRI) has published a number of reports on the topic of underground transmission. Membership largely consists of utilities, but is also open to government agencies that fund or support energy research. EPRI will issue an updated edition in 2007 of its 1992 *Underground Transmission Systems Reference Book*, which will "compile the most up-to-date technical information on underground transmission systems." Dominion engineers referred to the requirements of this book in a recent case in Loudoun County (2002-00702).

Similarly, the National Rural Electric Cooperative Association is publishing a report this year on the costs and benefits of undergrounding. JLARC staff asked if the SCC was a member of these organizations and had access to their reports. SCC staff informed JLARC staff that the commission does not belong to these organizations, and as such would not have access to their reports and data. Instead, it appears as though the commission would only have access to this information if a utility or other participant in a transmission line case introduced it into the record.

SCC Staff Do Not Have the Routine Access to Computer Resources Used to Replicate Utility Analyses. Although SCC staff have played an active role in evaluating the need for new facilities, staff have also testified that the commission does not possess the internal computer resources necessary to independently execute the reliability models used by utilities to justify new transmission lines.

The mandatory standards set by NERC (the North American Electric Reliability Council) require utilities to ensure that the transmission system is able to operate during peak loads and also be capable of responding to contingencies. (A contingency is an unexpected failure of a critical transmission system component, such as a transmission circuit or substation transformer.) NERC standards help explain why underground lines are built with two circuits (or a spare cable), because a second circuit allows the underground line to remain operational even if problems occur with one circuit. In addition, Chapter 5 discussed the unique characteristics of underground lines and why additional equipment may be required to address potential reliability concerns or the effects that underground lines may have on the operation of a network.

Utilities analyze the effect that new lines or generators will have on other circuits by using software that models load flows. For example, in the Bristers-Gainesville 230 kV case (2006-00048), Dominion's load flow studies identified three single contingency violations, and four double contingency violations that result from increased load growth. Dominion stated that all seven contingencies would be eliminated by the proposed line.

Utilities also use this software to determine what equipment may be needed to counter the unique effects that underground lines have on load flows. The director of a 345 kV undergrounding project in Connecticut undertaken by Northeast Utilities told JLARC staff that "transmission planners must take all the information on cable systems into account when modeling the proposed additions," including the need for additional equipment to offset the effects of underground cables.

Presently, the SCC does not use this software, and it appears likely that the lack of access to this software affects the SCC's review of cases where underground lines are proposed. When a utility does not propose an underground line, it is up to other participants in the case to be aware of how the line could affect the overall transmission grid and what compensating equipment may be needed. Dominion has pointed to the fact that witnesses opposed to a transmission line have not performed modeling as a reason to discount their testimony. In a recent Loudoun County case, a Dominion engineer testified that a witness in favor of undergrounding "has made no attempt to perform any load flow analysis to show what happens to load flows on the transmission system in eastern Loudoun County if the proposed line is installed underground" (Rebuttal testimony volume 1, part 3, 2002-00702).

SCC staff have indicated that the commission will review the question of need in greater detail for major transmission lines or when need has been questioned. However, during 2005 proceedings for a 500 kV line in Fauquier County, SCC staff stated that it "does not have the software or computer resources to replicate the studies conducted by Dominion, and in fact would have to contract with a consultant to perform those studies" (2004-00062).

In response to a question from JLARC staff regarding the availability of these resources, the commissioners stated:

> The Commission would, on occasion, need to hire additional Staff or permit its Staff to engage outside experts to address thoroughly certain matters - such as performing detailed load flow modeling and contingency analyses in opposition to those presented by the applicant. The Commission has previously permitted its Staff to engage outside experts in various energy matters that present sufficiently complex issues to merit the devotion of additional resources.

SCC staff indicated to JLARC staff that in many cases it is possible to determine if load projections are reasonable based upon the experience they have developed in prior cases. However, it does not appear that contingency analyses that are used to establish the need for a line could be conducted without access to the requisite software and information. It further appears that these analyses would also allow the SCC to determine if a utility's reliability concerns regarding the impact of undergrounding on a network are valid.

As a result, it does not appear that the SCC can independently verify a utility's arguments that undergrounding is not feasible. This could be accomplished by retaining consultants in each case, or by acquiring the necessary software resources for internal use (such as software from PowerWorld Corporation). Verification of a utility's modeling could range from an independent analysis of reliability needs to the ability to execute the models created by utilities to justify a new line and its method of installation.

Recommendation (2). The General Assembly may wish to direct the State Corporation Commission to acquire the resources and information necessary to replicate utility load projections, load flow studies, and contingency analyses in every transmission line case.

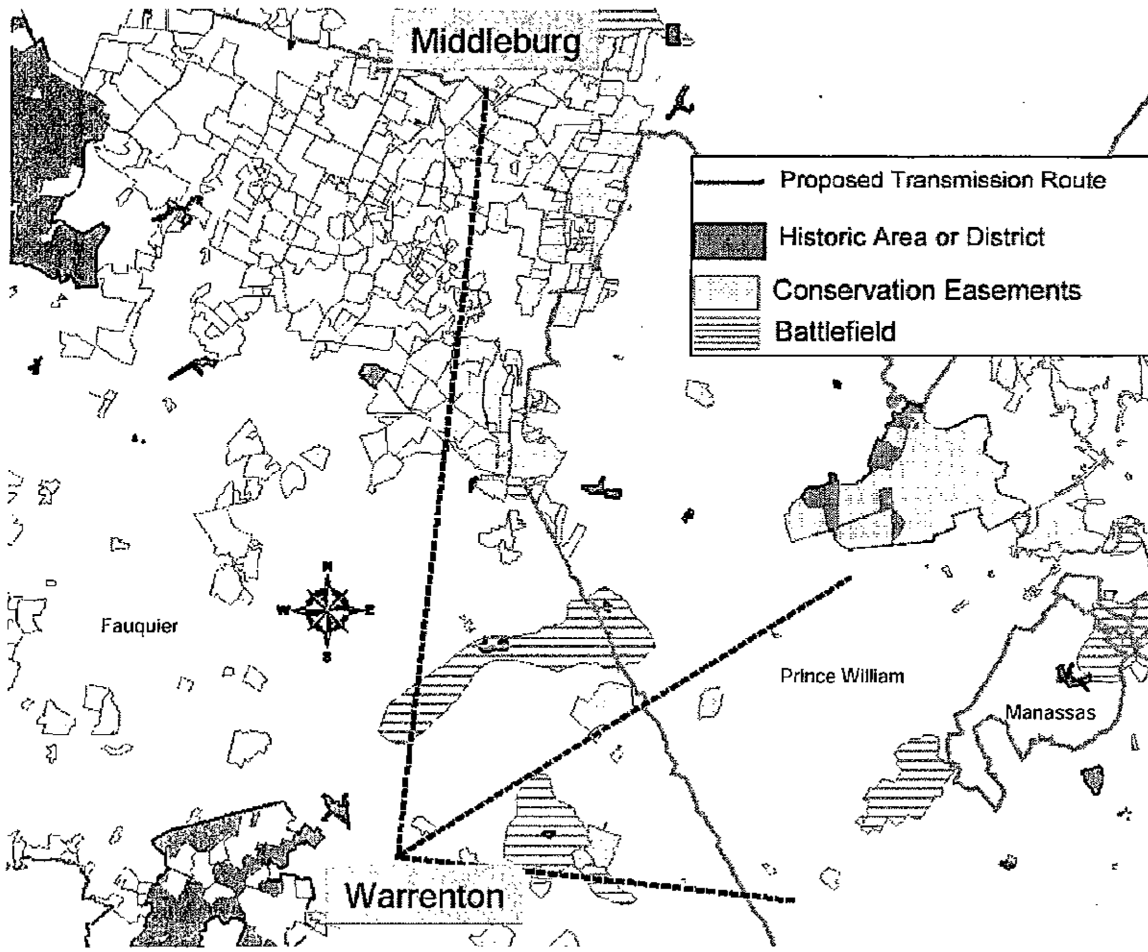
Greater Availability of GIS Resources Would Benefit All Parties. The review of proposed transmission lines would also be aided by greater use of GIS information. Figure 18 illustrates how GIS can assist policymakers and planners, by indicating each of the three routes Dominion is considering for a transmission line from Warrenton in the year 2023.

Presently, SCC guidelines request paper copies of highway maps that indicate where a proposed transmission line will be routed. During proceedings, these maps may be supplemented with aerial photographs and other exhibits. In one recent case in Loudoun County, Dominion provided DEQ with a GIS map of the proposed and alternate routes. However, this map was a rough illustration of the various routes, and was of poor accuracy and completeness in comparison to the GIS maps used to create the paper exhibits. The GIS map also does not appear to have been generally available, in contrast to the paper maps which were published by Dominion on their website.

Dominion planning staff described to JLARC staff how they are making greater use of the GIS resources that are provided by localities. GIS data enables planners to overlay current and future developments with existing transmission and distribution networks. Dominion staff stated that their planning activities could be improved substantially if they had greater access to updated GIS data from around the State. However, while this point is reasonable, it needs to be balanced with the concerns expressed by local officials who stated that Dominion does not provide data they request as part of their local economic development activities.

Recommendation (3). The General Assembly may wish to amend Section 56-265.2 (C) of the *Code of Virginia* to state that a digital geographic information system (GIS) map showing the location of any electrical utility facility shall be filed with the State Corporation Commission. The General Assembly may also wish to direct the State Corporation Commission to make these GIS maps publicly available on their website.

Figure 18: GIS Maps, Which Show Location of Significant Features, Can Assist Planners In Determining Where Transmission Lines Should Be Routed



Note: Transmission line routes illustrate the locations to be connected, not the actual route.

Source: JLARC staff analysis of GIS data from the Department of Historic Resources, the Department of Conservation and Recreation, and other data from Dominion.

STATUTORY CLARIFICATION MAY IMPROVE THE SCC'S REVIEW OF TRANSMISSION LINES

Current statutes do not provide guidance on the application of cost considerations to proposed transmission lines. In addition, the commissioners have indicated a willingness to interpret some legislative terms that are not defined in statute, and have applied the cost criterion differently depending on the circumstances of a case. As a result, there is some ambiguity about whether the definition of "cost" is limited to construction and maintenance costs, or can be broadened under current statutes to include other factors such as lost property value. Under the current framework, the commissioners do not appear to consider the impact of a transmission line on property values unless the issue is raised by a participant in the case, nor does the SCC use monetary estimates of other "external" environmental costs. There is also some statutory ambiguity as to whether the General Assembly intends for the SCC to consider environmental factors when reviewing underground transmission lines.

Commission Does Not Routinely Use Certain External Costs In Reviewing Transmission Lines

In the cases reviewed by JLARC staff, the commissioners have not routinely indicated the cost factors on which their decision was based. When final orders contain explicit cost discussions, the commissioners have limited their discussion to construction costs. These costs frequently include the expense of obtaining right-of-way, along with materials and labor. Although the commissioners have cited some cost estimates beyond construction costs they do not appear to routinely consider these additional costs or discuss them in final orders.

The commissioners have also noted that their authority to consider quantitative environmental externalities is limited. Externality costs are those effects of constructing a transmission line that are not included in the cost of the project. For example, an externality may occur if the presence of a transmission line harms habitat, historic sites, scenic assets, or human health or safety, and these potential effects are not included in the cost of a project.

Placing a monetary value on these potential costs can be contentious, and it may not be possible to account for these impacts by developing monetary estimates. As a result, although a strict definition of externality costs would include any cost that is not included in the price of a project, the term is often applied to issues for which reliable dollar estimates are not available. For instance, the effect of a transmission line on property values is frequently estimated, but placing a value on human or animal life is more difficult. As such, certain factors which have been considered in some cases, such as property value effects, may not be strictly considered to be environmental externalities but a lack of uniform consideration of these factors means that they are not consistently "internalized."

The policy to not consider quantitative environmental externalities was established by the commission in a case involving an investigation of the conservation and load management programs of utilities (1990-00070). In the final order, the commissioners noted that their authority to quantify externalities is limited and that they instead render decisions based upon qualitative factors. The final order observed that the conditions imposed upon utilities in certification cases may affect rates, and that Section 56-235.1 requires "cost-based" rates. As a result,

> We believe that it would be speculative, and thus contrary to our legal authority, to include adjustments in rates for external environmental factors. Moreover . . . incorporating selected externalities, but ignoring the impact of others, could distort the balancing process and lead to economic inefficiency, resulting in higher utility rates for all customers. We therefore agree with our Staff and a number of the parties, who suggested that incorporation of environmental externalities should be dealt with from a broader perspective than utility ratemaking. Congress and the General Assembly are the proper bodies to provide this perspective. When and if we are directed by legislation to incorporate quantified environmental externalities into the regulatory process, we shall do so, of course.

JLARC staff asked the commissioners whether this case represents current commission policy. In response, the commissioners stated, "As there has been no statutory change on this matter, such analysis remains as Commission precedent on this question."

However, since the adoption of that policy the final orders indicate that the commissioners have at times considered costs other than construction costs, but the final orders do not indicate whether they are routinely and uniformly considered. For example,

- The commissioners have accounted for "line losses" in approving certain types of transmission lines. (Line losses occur due to the conversion of electricity to heat and electromagnetic energy, which means that not all of the power introduced into a transmission line reaches the other end.) In a 1994 opinion approving construction of a 500 kV line in southern Virginia, the commissioners cited a monetary estimate of the "line losses" associated with a lower voltage alternative. Because a higher voltage line was said to have lower line losses, the opinion reasoned that a lower-voltage (230 kV) alternative would require the generation of more electricity and cause additional air emissions. According to an estimate provided by Dominion, the net present value of these line losses over the life of the project would total over $66 million (1992-00058). Line losses were also cited in approving a 765 kV line, where the commissioners noted, "In essence, line loss savings produced by the line will offset much of its cost" (1991-00050).
- In some cases, information on the impact that overhead lines will have on the value of nearby property has been consid-

ered. This information indicated a specific percentage reduction in the value of houses close to the transmission line. The hearing examiner and commissioners considered this information and found that mitigation techniques other than undergrounding would satisfy the statutory factors. (In at least one of these cases, it appears that the cost of undergrounding exceeded the total decrease in property values.)

- In a recent case in Virginia Beach, Dominion provided compensation for unavoidable impacts to wetlands by purchasing mitigation credits (2006-00040). This method relies on third parties (neither the regulating agency nor the company) to produce replacement wetlands (credits) in exchange for payment. These credits can then be used to offset wetlands that are degraded during construction activities. This approach may therefore provide a means of internalizing some environmental externalities.

JLARC staff further inquired as to whether the commission would be in a position to develop a sufficient record, at the request of the General Assembly, that would quantify externalities such as the potential impact of electric transmission lines on (1) human health and safety and (2) the value of private property. The commissioners responded:

> If the General Assembly directs the Commission to quantify specific environmental externalities, the record will be built by those who choose to participate on such issue. As noted above, in transmission line cases the Commission is required to consider all reports from state agencies concerned with environmental protection (see Va. Code § 56-46.1 A). The Commission's Staff currently would need to engage outside experts to address quantification of environmental externalities, unless those agencies charged with administering Virginia's environmental laws sponsor testimony quantifying environmental externalities.

Recommendation (4). The General Assembly may wish to direct the State Corporation Commission to develop a record to indicate which cost factors should be consistently addressed whenever the commission is required to approve the construction of any electrical utility facility, and to modify commission policies and procedures accordingly. Cost factors that the commission should consider include (1) the monetary effect of an electric facility on the value of land and structures within and immediately adjacent to the proposed location or corridor; (2) the cost of energy lost during the transmission of electricity (line or load losses); and (3) the potential for increased use of wetland mitigation credits.

Statutory Basis for Environmental Reviews of Underground Lines Is Not Clear

During a recent case in Loudoun County (2002-00702), Dominion argued that the commissioners could not follow the hearing examiner's recommendation that the line be undergrounded "and also comply with its own obligations under § 56-46.1." As noted at the beginning of this chapter, the Utility Facilities Act states that "The certificate for **overhead** electrical transmission lines of 150 kilovolts or more shall be issued by the Commission only after compliance with the provisions of § 56-46.1" [emphasis added].

The original language in this statute was modified by the General Assembly in 1985 to add the modifier "overhead." By adding this modifier, it appears that there is not a clear statutory basis for requiring that an **underground** transmission line of 150 kV or more be approved in accordance with § 56-46.1.

In practice, this statutory modification may not have had an effect, because it appears that utilities and the SCC have usually considered all underground lines to be extraordinary, and as such have reviewed them in accordance with § 56-46.1. Indeed, in its 2005 report to the General Assembly on the *Implications of a Requirement to Consider Undergrounding of Electric Transmission Lines,* the commission stated that § 56-46.1 is applicable to "all transmission lines capable of carrying 150 kilovolts." Stated as such, however, this would exclude underground lines of 69, 115, and 138 kV—the voltages in use below 230 kV. Moreover, in at least one instance Dominion requested that the commissioners declare that a proposed 230 kV underground transmission did not require certification pursuant to the Utility Facilities Act (2002-00180). These ambiguities suggest that legislative clarification may be warranted.

Recommendation (5). The General Assembly may wish to amend Section 56-265.2 of the *Code of Virginia* to add the language in bold: "The certificate for overhead electrical transmission lines of 150 kilovolts or more, **and underground transmission lines of any voltage,** shall be issued by the Commission only after compliance with the provisions of § 56-46.1."

IMPROVED COORDINATION BETWEEN UTILITIES AND LOCALITIES MAY ADDRESS SOME PUBLIC CONCERNS

As the previous chapters have discussed, the SCC has only approved underground lines when they would not pose higher costs for ratepayers. This has occurred when no viable overhead route existed or when a third party was willing to bear the costs. In instances in which no viable overhead route has been found, there are generally two inter-related reasons for this: the expense associated with acquiring the land or an easement (through purchase or condemnation), or the need to demolish houses, apartments, and other buildings on the potential transmission route. Under these circumstances, underground lines have been requested and approved because the approach best satisfies two of the statutory factors: the need to minimize cost and the need to avoid the "environmental" harm associated with demolition, especially of dwellings.

If this pattern holds true, it suggests that future underground lines will be certified only if population density makes an overhead route too expensive or environmentally insensitive. Moreover, if Dominion's operational and reliability concerns are valid, then it would appear to be to the company's and ratepayer's benefit to avoid undergrounding. This may be aided by improving the coordination of Dominion's transmission planning and locality comprehensive plans.

Yet Dominion has previously agreed to undergrounding lines if a third party paid for the costs, and the SCC has approved this outcome. If operational and reliability concerns can be successfully addressed, and a third party payer can be found, then undergrounding may be feasible. At present, however, the lack of prior coordination and other forms of cooperation between Dominion and local governments makes this outcome unlikely. This situation, combined with the lack of readily available information on Dominion's planned transmission lines, limits the feasibility of allowing surrounding property owners or local governments to pay for undergrounding. This is compounded by the relatively short time frame given by Dominion to decision makers. As indicated in Table 19 (Chapter 9), for cases filed in the past five years Dominion has sought approval between six and 23 months prior to the date by which the company needed to begin construction.

As a result of the lack of prior coordination and the limited time frame for decision making, the SCC will likely receive cases in the future in which the need to build a line within one or two years may cause lines to built overhead that might reasonably be placed underground, or lead to the use of routes in which undergrounding becomes necessary but might have been avoided.

The feasibility of greater coordination to address these concerns is indicated by examples from at least two prior cases. In these instances, undergrounding was requested by local citizens or governments but their concerns were satisfied in stipulated agreements by other means. This suggests that improved coordination prior to transmission line hearings may have another tangible benefit: judicial economy.

Improved planning may be especially important if State and local policymakers wish to retain control over the siting and approval of certain future transmission lines, which the federal government may designate are of national importance. One such line has been proposed in Northern Virginia, and if it is designated as a National Interest Electric Transmission Corridor (NIETC), then State control could cease 12 months after either this designation or after the case is filed with the SCC.

Dominion's Planners Consider a Variety of Factors

Dominion staff state that the need for new transmission lines is generally driven by increased electricity usage at the local (distribution) level. In addition, new lines may be needed to relieve congestion by allowing cheaper electricity to reach areas of high demand and to improve the reliability of the transmission system.

As a result of these considerations, Dominion staff indicate that their planning process attempts to incorporate the needs of both their distribution and transmission network. Dominion has about 11 planners who study annual changes on its distribution circuits. The load changes on the distribution lines that serve a particular area are then summed at the substation level. In evaluating annual load changes, Dominion includes

- percentage changes, which are a function of population changes and increases in the per capita consumption of electricity, and
- block changes, such as zoning changes or new subdivisions, additional manufacturing and industrial plants, and abrupt changes in the economy. Distribution planners cited the example of Rt. 288 in Chesterfield County as a block change.

The horizon for detailed distribution planning is two years, and five years for higher level planning. Transmission planners stated that the horizon for transmission planning is longer—five years for detailed plans and 10 for higher level—because the process of obtaining certification from the SCC and then constructing the line requires more time. Dominion begins evaluating potential routes as soon as the need for a new line is identified. The company also plans further into the future—15 to 20 years—by purchasing rights-of-way.

Dominion Staff Report Challenges in Staying Abreast of Changing Local Conditions

Dominion staff report that they stay abreast of local comprehensive plans and regularly attend planning commission meetings. In addition, they are often in the field and observe where new development is occurring. Distribution planners use several strategies to identify these block changes, including speaking with developers, monitoring the local newspapers, and working with a locality's economic development officials. The challenge, as they see it, is determining when growth is likely versus merely possible.

However, Dominion's planners indicated that their efforts are complicated by the need to account for the demands of electric cooperatives, and the changing nature of local planning. Dominion staff indicated that localities do a good job with transportation, sewer, and other locally-provided utility services, but they give very little attention to electric transmission needs. They pointed out that many localities do not discuss existing transmission line rights-of-way in their comprehensive plans, nor do they address how the need for future right-of-way could change with new development.

JLARC staff inquired about the feasibility of communicating with localities with greater frequency or working with local officials to identify potential transmission line corridors. Dominion staff agreed that more dialogue with localities is needed. However, they expressed a concern that open discussion could encourage land speculation and ultimately increase the cost of right-of-way acquisition. Staff described their ongoing efforts to coordinate with certain Northern Virginia localities, by sharing twice annually their distribution and transmission planning, and speaking with economic development officials to identify areas rezoned for mixed-use and other anticipated changes.

As an example of the kind of information that could be more regularly exchanged between Dominion (or other utilities) and local governments, Dominion plans on networking a 115 kV line that now connects to a substation in Middleburg (Loudoun County) by building a new line from Middleburg north to the Leesburg area. Dominion will need to build this line when the load it carries exceeds 100 MVA, which it anticipates will occur within the next ten to fifteen years. However, Dominion notes that the date that this new line between Middleburg and Leesburg will be needed depends upon the rate and size of development in the area around Middleburg, a factor over which the Counties of Loudoun and Fauquier have some control. However, Dominion could assist local planners and citizens by informing them of the effect that new development has upon the power grid. Information that may be useful includes data on the current load carried by existing transmission circuits, and how close it is to the need for upgrades, including additional lines. For instance, Dominion's Long Range Plan states that the load on the 115 kV line to Middleburg is expected to be 77 MVA by the summer of 2007—or 77 percent of its capacity.

SCC Staff and Dominion Assert that Localities Need to Incorporate Utility Plans into Local Planning

In recent transmission line cases, SCC staff have emphasized the importance of long-range planning by utilities. SCC staff have also discussed two aspects of long-range planning that affect local governments and property owners. First, SCC staff have argued that purchases of land or easements by a utility "serve to provide advanced notice to the public about where lines and stations will eventually be built so that the public [can] make informed land development decisions." Second, SCC staff have added that "local planning officials would well serve their citizens by including the long-range bulk power expansion plans of electric utility companies in their information systems." Dominion has stated that it "agrees with the Staffs comment that local planning officials would serve their citizens by considering Dominion's long range expansion plans in their planning processes."

SCC Staff and Dominion Suggest That a Utility's Ownership of Easements Constitutes Public Notice of Intentions. As part of a transmission line proceeding, the SCC issues an "order for notice" requiring the utility to publish notice of the proposed route in the local newspapers of affected localities. In addition to the formal notice requirements set forth in statute, SCC staff appear to believe that the ownership of easements by a utility constitutes a form of public notice. During 2004 hearings for a 500 kV line in Fauquier County, Dominion staff explained that the planning for Dominion's 500 kV system dates back to the 1970s (2004-00062). At that time, the company purchased right-of-way across Stafford and Fauquier Counties to allow for the construction of 500 kV lines to the Possum Point Generation Station in Prince William County. As noted by the hearing examiner,

> Since 1970, the Board, the Fauquier County Planning Commission, and the landowners adjoining the transmission line right-of-way have been on notice that at some point in the future a second transmission line might be built. That time has come.

Dominion also appears to take this stance, noting that all of the property owners "have been on notice at least since the condemnation proceeding was filed in 1973." It is not clear if this position is endorsed by the commissioners since in this same case the commissioners did not take a position on this issue. It may be instructive to note, however, that the final order advised that "portions of the Hearing Examiner's Report only are adopted if explicitly done so herein."

JLARC staff asked local planning staff how an individual would find utility easements on land they were planning to purchase. In all three counties, planners indicated that the information was available for viewing in their offices. In one county, online maps indicate some easements, but not all, nor do they indicate the owner or intended use.

In response to questions about the role of the local government in reducing conflicts between homeowners and a utility's planned use of an easement, one locality stated that they have recently adopted a 200-foot setback requirement from the edge of the transmission right-of-way for the location of new houses. Planning staff in another locality said they have traditionally relied on the developers to warn homeowners of nearby easements. JLARC staff also asked Dominion for information on easements which it owns but has not used, and this information is presented in Appendix H.

SCC Staff Have Also Argued That Dominion Should Change Certain Aspects of Its Planning Process. In at least two recent cases, SCC staff argued that Dominion should extend its long-range planning horizon beyond ten years. (Of note, Dominion's long-term plan includes certain projects with an anticipated date beyond 2020, but it is unclear to what extent detailed planning is undertaken for these projects.) In arguing for an extended horizon, SCC staff pointed to the potential to mitigate the negative effects of transmission lines in high-growth areas:

> Virginia Power's bulk power system planning process formally looks no further than 10 years. While this may produce acceptable results in low-growth areas, this case clearly demonstrates that waiting too long to begin building transmission lines in areas with rapid growth creates unnecessary public opposition, limits route choices, increases necessary mitigation, and increases costs. To a great extent, these problems can be reduced by locating lines before, rather than after, rapid development begins in an area. The building of new transmission lines would be less contentious and less expensive if both Virginia Power and the local governments worked together on long-range planning for bulk power system expansion, and utilized a planning horizon beyond the 10 years currently used by Virginia Power.

The commissioners considered the merits of this argument in a recent case involving a transmission line in Loudoun County. In the final order, the commissioners adopted the hearing examiner's finding that Dominion "should work more closely with the Staff on long-term transmission planning in areas such as Northern Virginia where projected load growth is significant" (2002-00702). However, local planning officials report that they do not regularly communicate with Dominion, which suggests that the company may need to more closely cooperate with local staff and not just SCC staff.

Local Planning Staff Desire More Information and Coordination

JLARC staff visited three counties in Northern Virginia in which Dominion is planning on building new transmission lines in the next few years. In all three of these counties, local planning staff indicated that the amount of information provided by Dominion was minimal and focused on where to route a new line or site a substation. In other words, the information did not indicate that alternatives were available to an overhead line, nor was the information provided sufficiently far in advance to allow the locality to assist in designating transmission line corridors or ensure that the land use around an existing corridor was compatible with Dominion's plans. However, it also appears that local officials would benefit in future years from asking more extensive and direct questions about Dominion's plans.

In each of these counties, there are concrete examples of how the current lack of coordination between localities and Dominion affects transmission line cases and results in calls for undergrounding:

- Planning staff in one locality stated that Dominion discussed the location of a new substation for five years but had not provided information about the associated transmission lines. However, it does not appear that local staff asked about these plans. Moreover, as a result of accepting proffers from developers, schools were built on the edge of a transmission line right-of-way. Currently, local citizens are protesting a proposed line and calling for alternate routes or alternatives—including undergrounding. Planning staff were receptive to sharing the county's development plans with Dominion and stated that Dominion could be more forthcoming with its long-term plans.
- In a second locality, planning staff indicated that Dominion had been a good partner and had agreed to mitigation efforts associated with a new substation and other facilities. How-

ever, local staff appeared to be unaware of Dominion's plans to build several new lines to the substation and noted that the locality has never discussed long-term plans or projects with Dominion because the company "is always close to the chest." A more open approach, staff said, would improve the public's understanding of the need for transmission lines. Lastly, staff expressed a desire to work more closely with the company to better understand how they develop their growth projections and indicated a willingness to work with Dominion to designate a corridor for needed lines.

- Staff in the planning department of the third locality took issue with Dominion's claims that utility planners attended planning meetings and met with local staff. Staff were also unaware of a new line proposed by Dominion that may cross their county, or of Dominion's future plans, and indicated that knowledge of Dominion's plans could greatly influence ongoing rezoning activities. Specifically, if an existing right-of-way was a more desirable option, the locality needed to know this before it allowed new developments alongside that would prevent the right-of-way from being widened.

In addition, it appears that there may be a benefit to greater regional cooperation between localities. Planning staff in one locality expressed their frustration that they serve as the location for electric facilities that serve the needs of neighboring localities. Residents in some localities also have made greater use of conservation easements, and some localities have gone to greater lengths to preserve a rural landscape. As a result, a transmission line may be routed through one locality because of land use decisions in a neighboring locality. Planning among localities could assist with these issues.

It is important to note, however, that many of the existing electric facilities were built in the 1960s or 1970s, when they would have had much less impact than at present. Moreover, the statutory requirement that existing right-of-way be used—which may favor the purchase or condemnation of new land alongside an existing corridor—means that future lines are more likely to be built where existing lines now stand. And if any of the existing lines were built prior to 1972, the approval was granted at the local level. In light of these factors, if the use of undergrounding follows historical patterns, then overhead lines will continue to be a feature of the landscape.

Insufficient Planning and Coordination May Have Resulted in Previous Need to Underground Lines

Greater coordination between local governments and utilities may be beneficial to all parties, as evidenced by prior cases where a lack of advanced coordination resulted in the need to use underground lines.

Undergrounding Is Primarily Used When No Viable Overhead Route Exists. The main reason for Dominion's use of undergrounding seems to result from the lack of viable overhead routes, which is closely tied to cost because of the larger right-of-way required by an overhead line. A lack of viable overhead routes appears to have resulted from three factors:

- the need to remove overhead lines as a condition of the easement granted by a railroad;
- the need to avoid posing a hazard to aircraft and ships, such as aircraft carriers; and
- the presence of rapid development.

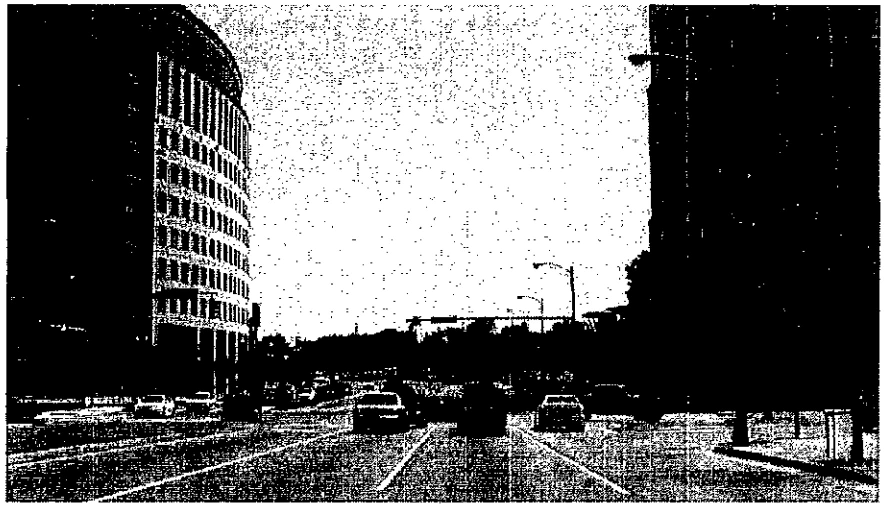
Earlier Cases Indicate That Rapid Development Has Eliminated Viable Overhead Routes. Rapid development has two consequences that result in the use of undergrounding. First, changes in land use or further increases in population density result in a need for transmission in an area in which viable overhead routes are no longer present. Dominion has requested permission to build two lines for these reasons.

The Glebe-Davis line in Arlington County (1988-00063) was built underground because of increasing density:

> The transmission system to Crystal [City] Substation was installed in the early 1970's and at that time, because of the high density, the 230 kV transmission line was installed underground. Then, and now, there is no viable overhead transmission route available for this new line.

The Glen Carlyn-Clarendon line, which crosses under Glebe Road north of Fairfax Drive in Arlington County, was built as a result of changes in land use: "Construction and operation of the rapid transit system is expected to accelerate development in the Clarendon area." Underground construction was selected as the "most practical" on the basis of "land use in the area and available rights-of-way." As Figure 19 illustrates, additional transmission lines in this area could not reasonably be built overhead.

Figure 19: Underground Line Was Used Under a Street in Arlington County Because No Viable Overhead Route Was Available



Source: JLARC staff photograph.

Rapid development also appears to require undergrounding when a lack of coordination between Dominion and localities eliminates a previously viable overhead route already identified by Dominion. The effect that rapid development can have on transmission line cases, when a locality and a utility do not coordinate their plans, is seen in two cases in Fairfax County.

In 1986, Dominion filed its application for the Burke-Sideburn line in Fairfax County, south of George Mason University (1986-00019). In the application, Dominion indicated that the line was originally planned to be an overhead 115 kV line between Burke and Ravensworth, and that right-of-way acquisition began in 1969 and was completed in 1975. The project was delayed in 1978 for unspecified reasons, but would never have been reviewed by the SCC because it was less than 150 kV. Dominion further stated:

> Increased residential development in this area prompted a reactivation of the project for 230 kV transmission to provide adequate service. Because development was so rapid, an additional substation [Sideburn] was needed by this time. . . . The density of residential development between Burke and Sideburn substations is such that our original overhead route no longer exists. . . . The Company has retained a right-of-way but it is not environmentally feasible to consider overhead construction in this area. . . . [O]ne section is located between townhouses which were built after the right-of-way was obtained [Figure 20]. *Because of*

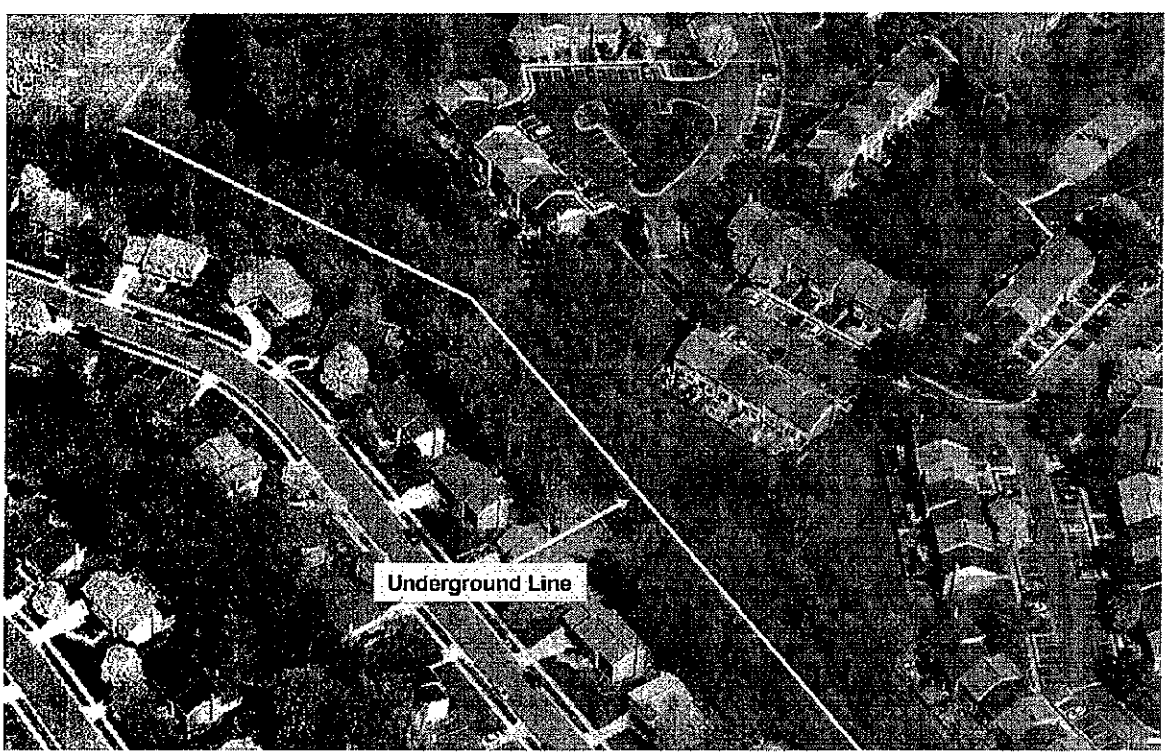
the rapid development of the Burke area, no viable overhead corridor exists [emphasis added].

Subsequently, in 1988, Dominion requested permission to put another 230 kV line underground, from the Pender substation to the planned Oakton substation. According to Dominion's application, the transmission line

> was originally considered in 1973 as an overhead line. Rapid development and the rise in land value in the Fairfax area has changed what may have been a viable option in 1973 into an unacceptable alternative today. The project was deferred in 1976 due to an increase in the demand for electricity. However, renewed growth and load projections showing existing circuits exceeding their normal loading capabilities in 1990 necessitates construction of the above project.

Dominion noted that the underground project would require a 25-foot-wide permanent easement and would cost $21 million. (An

Figure 20: Underground 230 kV Line in Fairfax County Was Built Because Rapid Development Eliminated Viable Overhead Route



Source: JLARC staff analysis of case 1986-00019; aerial imagery used with permission of Pictometry.

additional 25 feet of temporary construction easement would be required as well.) The overhead alternative, with a 120-foot-wide easement, would cost $47 million. As noted, Dominion's discovery of asbestos (actinolite) along the proposed route raised the cost of an underground line. Of note, information from the Department of Mines, Minerals and Energy indicates that data on the location of this actinolite schist in the Oakton area was first published in 1981, suggesting that the environmental reviews conducted today by State agencies may also play a valuable role in planning before a case is formally initiated. To this point no transmission line has been built, but Dominion's long-range plan includes this line plus another possible line beginning at Oakton.

Undergrounding Has Been Avoided Through Stipulated Agreements. Two earlier cases also indicate the value of advanced planning, and how it could reduce the need for contested transmission line proceedings. In these cases, stipulated agreements were reached between Dominion and other parties following SCC hearings in which undergrounding was advocated. The fact that these agreements were reached suggests that advanced planning may have allowed an amicable solution to have been achieved prior to the hearings.

In 1985, Dominion and Fairfax County submitted a settlement agreement to the SCC that become the basis for building the Sideburn-Ravensworth line overhead (1984-00028). In this agreement, Dominion agreed to several steps, including using a specific type of transmission tower, planting flowering trees, and correcting any radio or television interference caused by the line. Similarly, in 1990 Dominion reached an agreement with protestants that modified Dominion's preferred route. Chesterfield County maintained their desire for undergrounding, but agreed that the changes were satisfactory (1988-00071).

These cases suggest that improved coordination between planners at Dominion and local governments would be beneficial for several reasons:

- First, if undergrounding should be limited to only those circumstances where no viable overhead route is available, then improved coordination and planning would assist in the determination of suitable transmission line corridors. This would also assist localities in determining the proper location of schools and subdivisions. Such notice may also allow localities to modify planned growth, in its extent or location, if so desired.
- Second, if undergrounding is viable in an area, but a third-party source of payment is required, then advanced notice of

the need to build a line and potential route would assist in the determination of whether it is feasible to allow surrounding property owners to pay for the line. Advanced notice in this case would require that Dominion advise localities before a situation is reached where the need for a line is "acute," as the new Stafford line is described.

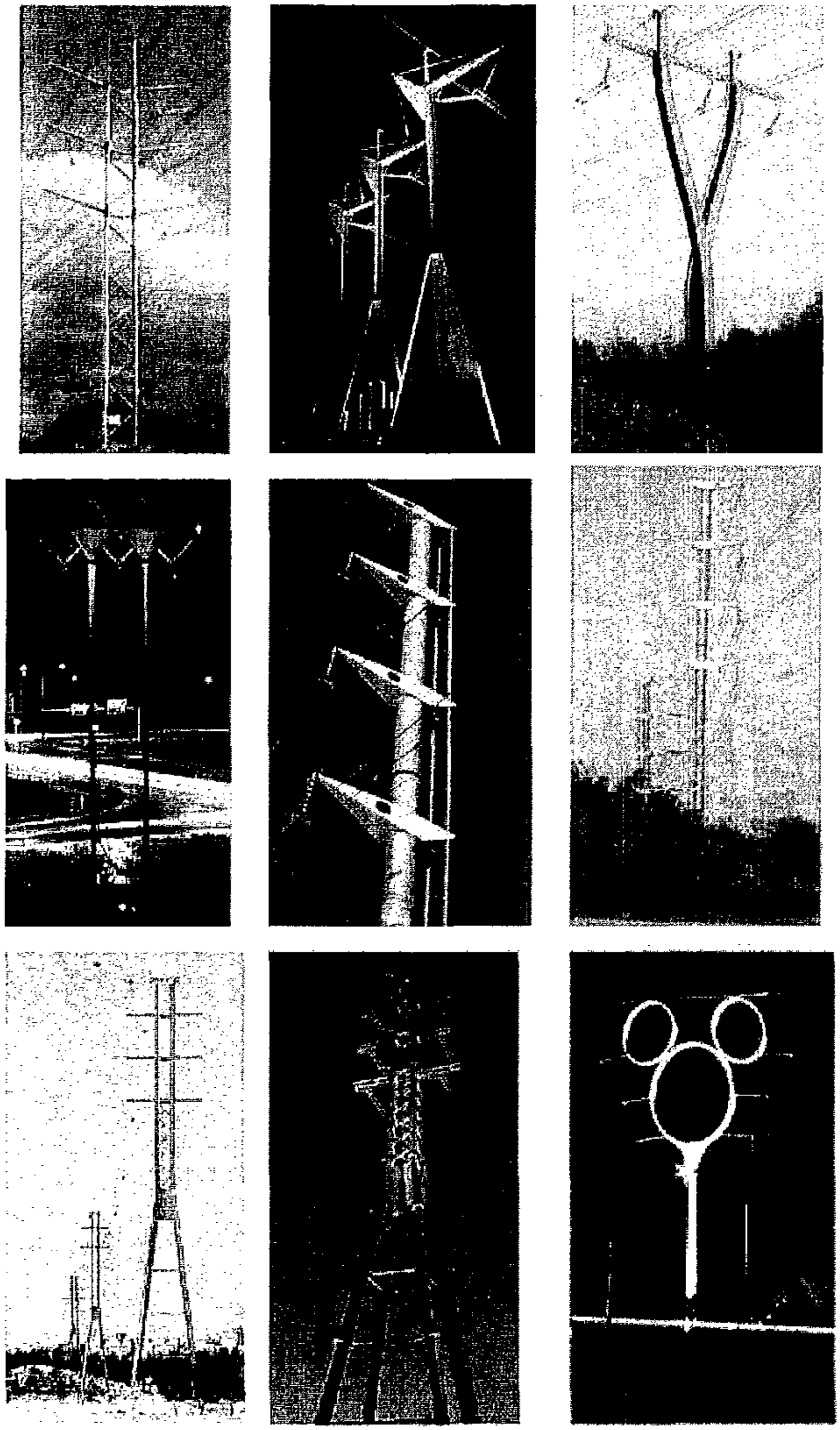
- Third, if undergrounding is not feasible, or if a transmission line cannot be routed such that it does not affect the viewshed or property values, then another option may be to have surrounding property owners pay for alternative tower designs, as depicted in Figure 20. Alternative tower designs may also aid economic development or tourism, as illustrated by the Walt Disney tower in Orlando, Florida (bottom right photograph, Figure 21).

Improvements in coordination could be voluntary, or they could take the form of legislative direction. In recent years, the General Assembly has considered several bills which recognized the importance of advanced planning:

- HB 2407 passed during the 2005 Session, in recognition of the long-term impact of an aging population and the needs of persons with disabilities, directed localities to include their requirements in their comprehensive plans.
- SB 699 passed during the 2006 Regular Session requires localities to submit their comprehensive plans or amendments to the Virginia Department of Transportation for comment and review.
- HB 5094 from the 2006 Special Session, which did not pass, would have required every county to amend its comprehensive plan to incorporate urban development areas with the intention of improving transmission planning.

Recommendation (6). The General Assembly may wish to amend Section 15.2-2223 of the *Code of Virginia* to direct local governments to include electric transmission and other utility infrastructure needs that are not presently included in their comprehensive plans. The General Assembly may also wish to direct publicly regulated utilities to provide their long-range plans in sufficient detail to local governments and State agencies upon request.

Figure 21: Alternative Transmission Tower Designs Could Be Considered



Source: Photographs presented at a 2006 meeting of the Towers, Poles, and Conductors subcommittee of the Institute of Electrical and Electronics Engineers.

Appendix A Study Mandate

HOUSE JOINT RESOLUTION NO. 100

Directing the Joint Legislative Audit and Review Commission to study the criteria and policies used by the State Corporation Commission in evaluating the feasibility of undergrounding transmission lines in the Commonwealth. Report.

Agreed to by the House of Delegates, March 2, 2006
Agreed to by the Senate, February 28, 2006

WHEREAS, it is the duty of the State Corporation Commission to consider environmental, economic, and service reliability factors in issuing certificates of public convenience for the construction of electrical transmission lines; and

WHEREAS, the relative environmental, economic, and service reliability factors considered by the State Corporation Commission vary with respect to the proximity of the transmission lines to densely populated areas; and

WHEREAS, the long-term implications of placing overhead transmission lines near densely populated areas must be carefully evaluated; and

WHEREAS, the costs of constructing overhead transmission lines may impact tax revenue, economic development, and property values in the immediate area of the transmission lines; and

WHEREAS, it is in the best interest of the public to provide for the least costly alternative in constructing electrical transmission lines; and

WHEREAS, the process of undergrounding transmission lines may mitigate many of the detrimental effects arising from the construction and location of overhead transmission lines; and

WHEREAS, the process of undergrounding transmission lines is not widely practiced in the Commonwealth; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the Joint Legislative Audit and Review Commission be directed to study the criteria and policies used by the State Corporation Commission in evaluating the feasibility of undergrounding transmission lines in the Commonwealth.

In conducting its study, the Joint Legislative Audit and Review Commission shall examine (i) the factors considered by the State Corporation Commission in its analysis of the feasibility of installing underground electrical transmission lines; (ii) the effect on property values resulting from installing underground, as opposed to overhead, electrical transmission lines, and the feasibility of allowing surrounding property owners to agree to pay for the installation of underground lines; (iii) the construction and long-term operating costs considered by the State Corporation Commission in reviewing electrical transmission line applications; and (iv) such other issues as it deems appropriate. This study shall not be conducted unless funding is provided in the appropriation act for such purpose.

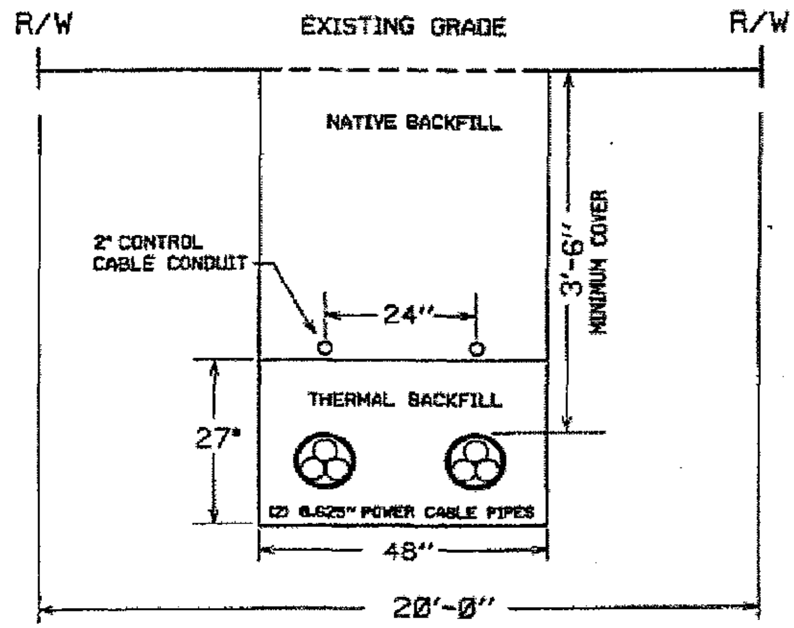
All agencies of the Commonwealth shall provide assistance to the Commission in the preparation of this report, upon request.

The Joint Legislative Audit and Review Commission shall complete its meetings for the first year by November 30, 2006, and for the second year by November 30, 2007, and the Chairman shall submit to the Division of Legislative Automated Systems an executive summary of its findings and recommendations no later than the first day of the next Regular Session of the General Assembly for each year. Each executive summary shall state whether the Commission intends to submit to the Governor and the General Assembly a report of its findings and recommendations for publication as a document. The executive summaries and reports shall be submitted as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents and reports and shall be posted on the General Assembly's website.

Appendix

B Underground and Overhead Transmission Structures Used By Dominion

Figure 1: Dominion Proposed an Underground 230 kV Transmission Line in 2002 for the Naval Base in Norfolk

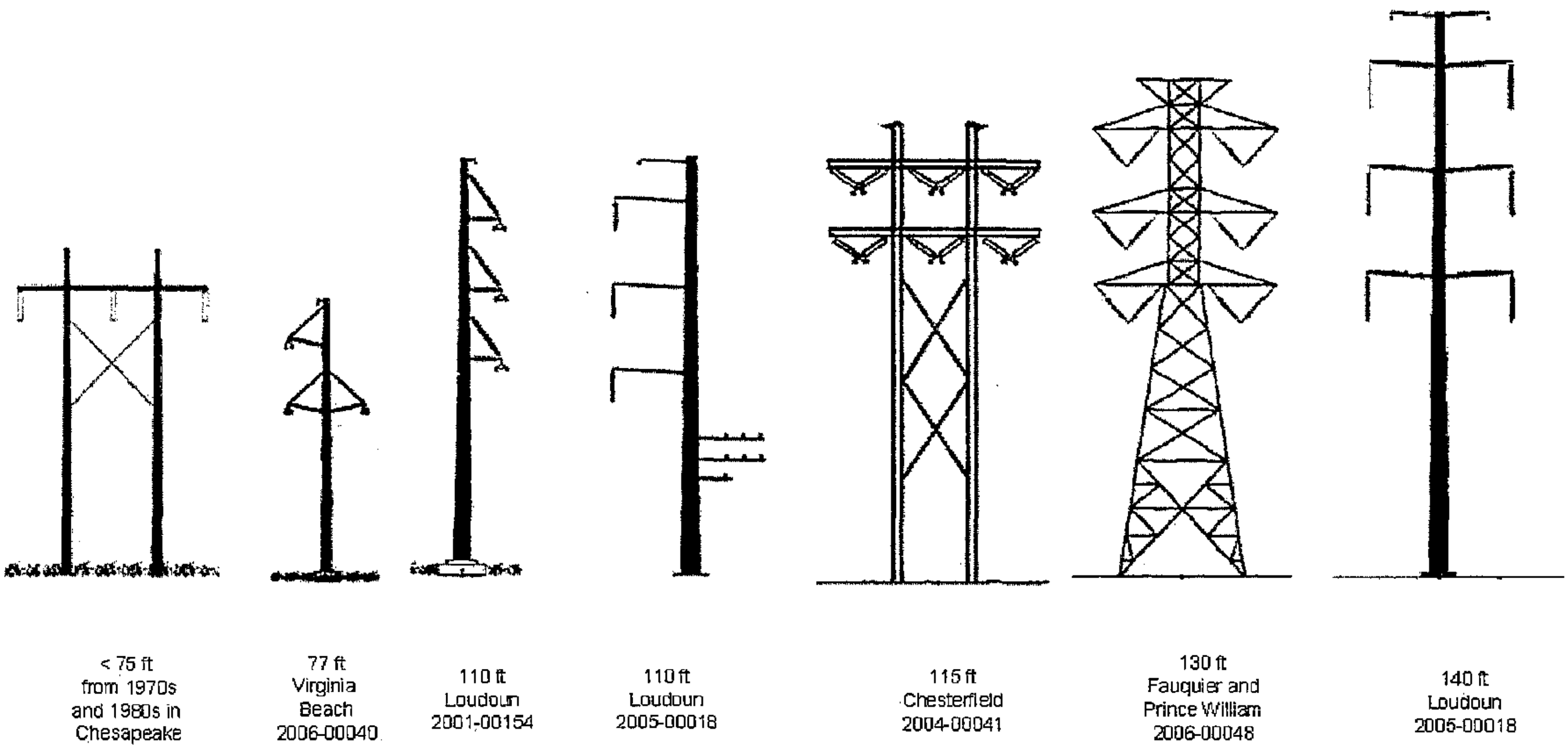


TYPE OF CONSTRUCTION:	230 kV DOUBLE CIRCUIT UNDERGROUND
TRENCH CHARACTERISTICS:	48 IN. WIDTH X 56.825 IN. MINIMUM DEPTH
FACILITIES IN TRENCH:	TWO 2 IN. PVC CONDUIT FOR CONTROL CABLE TWO FIBER OPTIC CONTROL CABLES TWO 8.625 IN. STEEL PIPES FOR POWER CABLE SIX 230 kV 2500 KCMIL COPPER CABLES (3 PER PIPE)
AAPROXIMATE LINE LENGTH:	3000 FEET

Note: The SCC approved the underground line in 2002.

Source: SCC staff report for case 2002-00180.

Figure 2: Dominion Has Proposed a Variety of Overhead Structures For Recent 230 kV Transmission Lines



Source: JLARC analysis of recent transmission line applications filed with the SCC.

Appendix

C Supplemental Tables

Table 1: JLARC Staff Reviewed 76 Transmission Line Cases Considered by the SCC Since 1972

File Number	Location	Voltage (kV)	SCC Outcome
1974-10848-A	Carroll, Floyd, Franklin, Henry, and Wythe Counties	765	Approved
1975-11655/10758	Fairfax, Fauquier, Louisa, and Warren Counties	500/230	Approved
1979-20084	Augusta and Rockingham Counties; Town of Mt. Crawford	230	Approved
1980-00006	Albemarle, Louisa, and Orange Counties	230	Denied
1980-00104	Fairfax County	230	Approved
1981-00007	Alleghany, Botetourt, and Rockbridge Counties	230	Approved
1981-00049	City of Suffolk	500	Approved
1982-00035	Cities of Chesapeake and Norfolk	230	Approved
1982-00075	Arlington County	230	Approved
1982-00091	Albemarle County	230	Approved
1983-00024	City of Suffolk	500	Approved
1983-00036	City of Alexandria	230	Approved
1983-00059	Fairfax County	230	Approved
1984-00007	Albemarle, Madison, and Orange Counties	115	Approved
1984-00009	Shenandoah County	138	Approved
1984-00028	Fairfax County	230	Approved
1985-00013/00020	Loudoun and Prince William Counties	230	Approved
1985-00024	Campbell, Halifax, and Pittsylvania Counties	230	Approved
1986-00019	Fairfax County	230	Approved
1986-00026	Fairfax County	230	Approved
1986-00035	City of Virginia Beach	230	Approved
1986-00060	Chesterfield County	230	Approved
1986-00066	King George, Richmond, Stafford, and Westmoreland Counties; City of Fredericksburg	230	Approved
1987-00035	Chesterfield and Fluvanna Counties	230	Approved
1987-00047	Prince William County	230	Approved
1988-00004	Fairfax County	230	Approved
1988-00016	Chesterfield County	230	Approved
1988-00023	Middlesex County	230	Approved
1988-00042	Fairfax, Loudoun, and Prince William Counties	230	Approved
1988-00063	Arlington County	230	Approved
1988-00071	Chesterfield County	230	Approved
1988-00072	Fairfax County	230	Approved
1988-00079	Fairfax County	230	Approved
1988-00094	City of Chesapeake	230	Approved
1988-00095	Caroline, Hanover, and Spotsylvania Counties; City of Fredericksburg	230	Approved
1989-00005	Fauquier and Prince William Counties	230	Approved
1989-00017	Charles City, Hanover, Henrico, and New Kent Counties	230	Approved
1989-00026	Chesterfield, Goochland, and Powhatan Counties	230	Approved

1989-00044	Shenandoah County	115	Approved
1989-00057	Prince William County; City of Manassas	230	Approved
1989-00073	Charles City, Chesterfield, and Henrico Counties	230	Approved
1989-00088	Dinwiddie County	115	Approved
1990-00003	Mecklenburg County	115	Approved
1990-00012	Rockbridge County	115	Approved
1990-00040	Rockbridge County	115	Approved
1991-00014	City of Virginia Beach	230	Approved
1991-00027	Goochland and Henrico Counties	230	Approved
1991-00043	Appomattox, Buckingham, Campbell, Caroline, Cumberland, Fluvanna, Goochland, Louisa, and Spotsylvania Counties	500	Approved
1991-00050	Botetourt, Craig, Giles, and Roanoke Counties	765	Withdrawn
1991-00059	City of Emporia	115	Approved
1992-00004	Rockingham County	115	Approved
1992-00024	Charles City and New Kent Counties	230	Approved
1992-00035	Albemarle County	115	Approved
1992-00058	Brunswick, Charles, Dinwiddie, Halifax, Lunenburg, and Mecklenburg Counties	500	Approved
1994-00022	Campbell County	138	Approved
1994-00036	Prince William and Loudoun Counties	500/230	Approved
1994-00044	Bedford, Franklin, and Pittsylvania Counties	138	Approved
1995-00057	Alleghany and Rockbridge Counties	230	Approved
1995-00134	City of Alexandria	230	Approved
1996-00071	City of Alexandria	230	Approved
1996-00099	Pittsylvania County; City of Danville	230	Approved
1996-00360	Fairfax County	230	Approved
1997-00766	Bland, Botetourt, Craig, Giles, Montgomery, Roanoke, and Tazewell Counties	765	Approved
1999-00009	Fairfax County	230	Approved
2000-00286	Prince William County	230	Approved
2001-00154	Loudoun County	230	Approved
2002-00180	City of Norfolk	230	Approved
2002-00702	Loudoun County	230	Approved
2003-00064	City of Chesapeake	230	Approved
2004-00041	Chesterfield County	230	Approved
2004-00062	Fauquier County	500	Approved
2004-00139	City of Norfolk	230	Approved
2005-00018	Loudoun County	230	Pending
2006-00040	City of Virginia Beach	230	Pending
2006-00048	Fauquier and Prince William Counties	230	Pending
2006-00091	Stafford County	230	Pending

Note: Cases exclude 23 transmission lines connecting a new generator or customer to the grid. Cases 1983-00024, 1987-00047, 1988-00004, 1988-00016, 1994-00036, 1995-00134, and 1996-00071 involved route or tower alterations to previously approved lines.

Source: JLARC analysis of transmission line cases reviewed by the SCC since 1972.

Table 2: Another 23 Transmission Line Cases, Intended to Connect a Generator or Individual Customer to the Grid, Have Been Considered by the SCC Since 1972

File Number	Location	Voltage (kV)
1984-00031	Greensville County	115
1986-00045	City of Hopewell	230
1987-00043	City of Portsmouth	230
1988-00008	City of Hopewell	230
1988-00074	Fairfax County	230
1989-00050	Prince George County	230
1989-00059	Chesterfield County	230
1990-00039	Campbell and Pittsylvania Counties	115/138
1991-00001	City of Chesapeake	230
1991-00019	City of Richmond	230
1991-00040	King William County and Town of West Point	230
1992-00043	Halifax County	230
1992-00046	Louisa County	230
1993-00052	King George County	230
1993-00073	Pittsylvania County	69
1994-00035	Halifax County	230
1995-00088	Goochland County	230
1996-00115	Henrico County	230
1997-00422	Henrico County	230
1998-00060	Dinwiddie County	230
1999-00351	Fauquier County	230
2000-00009	Caroline County	230
2001-00663	Fluvanna County	500

Note: Case 1997-00422 involved route modifications to a previously approved line.

Source: JLARC analysis of transmission line cases reviewed by the SCC since 1972.

Appendix

D Research Activities and Methods

JLARC staff addressed the study mandate by completing several research activities. Factors considered by the SCC in transmission line cases were examined. This review of all transmission line cases was conducted in part to ascertain how the SCC has responded to legislative direction on how to approve transmission lines, as embodied in statute. Staff reviewed the final orders of past transmission line cases before the SCC. Staff identified at least 99 cases since 1972 using the SCC's Annual Reports and Docket Search as well as online LexisNexis searches. Of these, 23 lines were built to connect new generating facilities or specific businesses to the grid. As a result, in this report, references to the total number of transmission line cases since 1972 have excluded the 23 lines in these two categories.

JLARC staff also reviewed cases involving underground transmission lines in greater depth. Only 17 cases since 1972 included a proposal by a party to the case to build a line underground. In nine of the 17 cases, staff reviewed available reports by SCC hearing examiners or SCC staff. In the remaining eight cases, JLARC staff relied upon the information contained in the application (when available) and the final order issued by the commissioners. These 17 cases are listed in Table 1 in Chapter 1.

The review of transmission line cases was supplemented with information obtained through other research activities. These activities included

- Internet searches,
- interviews with staff at Dominion Virginia Power, the SCC, and local governments,
- correspondence with transmission and undergrounding experts,
- data requests submitted to Dominion staff,
- site visits of electric facilities and lines with Dominion staff as well as independent site visits to underground and overhead lines, and
- the use of geographical information system (GIS) data provided by State agencies, local governments.

Appendix

E Underground and Overhead Transmission Costs

Tables 1 to 6 of this appendix show transmission line cost information that was compiled during this review.

Table 1 and Table 2 show estimates of underground and overhead line costs, respectively, on a per-mile basis.

Table 3 shows ratios of underground to overhead line costs that are based on Dominion estimates of costs in 2005 and 2006. The ratios vary depending on the use of initial installation and life cycle costs for XLPE and HPFF. The 2006 ratios are higher than corresponding 2005 ratios due to increases in the price of copper that is applied in estimating the costs for the underground lines.

Tables 4, 5, and 6 show estimated ratios of underground to overhead line costs that were identified during this review from sources other than Dominion. Table 4 shows ratios found during the review that did not include a specific identification of the kilovolt (kV) level assumed. This table presents the cost ratios in descending order. Tables 5 and 6 show ratios that were accompanied by a specific statement regarding the kV level assumed. These tables present the information based on ascending kV levels. A brief description of the information source for each ratio is given in a column of the tables in this appendix.

Table 1: Estimates of Underground Cost Per Mile by Dominion and by Other Sources

Estimated Cost Per Mile ($ millions)	Line Length	kV	Cable Type	*Other Information (Assumptions, Sources)*
13 to 15	2 miles	345	XLPE	Northeast Utilities, Bethel-Norwalk line. Higher cost includes transition station cost.
10 - 11.5	10 miles	345	HPFF	Northeast Utilities, Bethel-Norwalk line. Higher cost includes transition station cost.
10.2	0.5 mile	345	XLPE	1,500 MVA line. Estimate by expert testimony in Vermont.
10.2	5 miles	230	HPFF	Initial costs, single circuit line, Dominion estimate, July 2006
9.7	--	230	--	Double circuit line. Excludes ROW, engineering and design, and contingencies. Estimate for Ontario Power Authority.
8.2	27 miles	230		Jefferson-Martin line in California, 2006. Three of the 27 miles of the project were overhead.
8.2	0.5 mile	345	XLPE	500 MVA line. Estimate by expert testimony in Vermont.
8.1	5 miles	230	HPFF	Initial costs, single circuit line, Dominion estimate, July 2006.
7.9	Not specified	345	SCFF	Single circuit, 2002 dollars, Institute for Sustainable Energy
7.8	0.58 miles	230	HPFF	Dominion approximation of actual project costs for a double circuit line, 412 MVA, energized in 2003.
7.5	5 miles	230	XLPE	Initial costs, Dominion estimate, July 2006.
5 to 10	--	--	--	Aspen Environmental Group.
4 to 10	--	230	--	Burns and McDonnell staff, 2006
6.9	2.55	230	HPFF	Dominion approximation of actual project costs for a double circuit line, 637 MVA, energized in 1996.
6.5	1.5 miles	345	XLPE	1,500 MVA line. Estimate by expert testimony in Vermont.
6.4	Not specified	345	XLPE	Single circuit, 2002 dollars, Institute for Sustainable Energy
6.4	5.0 miles	230	XLPE	Initial costs (including ROW and miscellaneous costs). Dominion estimate, July 2005
6.3		345		Est. capital costs, Bethel-Norwalk project in Connecticut, without ROW and substation costs
6.2	3.6 miles	230		Dominion cost estimate as part of a transmission line proposal that was filed in 2001.
5.8	2.6 miles	138		Double circuit line through challenging terrain.
5.7	1.5 miles	230	HPFF	Dominion estimated project cost for a double circuit line, 412 MVA cables, energized 2005; final actual costs TBD.
5.6	Not specified	345	HPFF	Single circuit, 2002 dollars, Institute for Sustainable Energy.
5.0	Not specified	115	--	Single circuit, 2002 dollars, Institute for Sustainable Energy, mean of XLPE, SCFF, and HPFF/HPGF costs.
4 to 6	--	345	--	PJM per unit cost estimate, posted July 2004.
4.8	5.6 miles	230	XLPE	Project costs, California, 2002-04.
4.7	15.7 miles	230	XLPE	Loudoun County expert, 2005; excludes ROW costs and miscellaneous costs not directly involved in installation.
4.5	1.5 miles	345	XLPE	500 MVA line. Estimate by expert testimony in Vermont.
3.5 to 4.9	1.9 to 4 miles	150	--	Estimate for Nantucket Project, Cape Wind Associates, LLC.
3.5	--	230	--	PJM per unit cost estimates, posted July 2004.
2.9	--	115	--	Single circuit, 2002 dollars, Institute for Sustainable Energy, mean of XLPE, SCFF, and HPFF/HPGF costs.
2 to 3 plus	--	230	--	USDA Rural Development electric programs staff, 2006.
1 to 1.5 plus	--	115	--	USDA Rural Development electric programs staff, 2006.

Note: "--" means not specified.

Source: JLARC staff compilation.

Table 2: Estimates of Overhead Cost Per Mile by Dominion and by Other Sources

Estimated Cost Per Mile ($ millions)	kV	Other Information (Assumptions, Sources)
4.0	345	Northeast Utilities, Connecticut Bethel-Norwalk project.
2.9 to 4	500	Double circuit line. Estimate for Ontario Power Authority.
1.9 to 2.6	230	Double circuit line. Estimate for Ontario Power Authority.
1 to 3	--	Burns and McDonnell document.
2	500	From a capital cost analysis of energy transmission done by the Bonneville Power Administration and the Northwest Gas Association.
1.7 to 2.2 plus	345	Steel pole / tower. Institute for Sustainable Energy.
1.80	765	Seppa 1999 estimate, capital costs only.
1.71	345	Double circuit. National Council on Electricity Policy.
1.70	500	PJM. Cost does not include ROW.
1.4 to 1.9	115	Double circuit. Estimate for Ontario Power Authority.
1 to 2	--	Aspen Environmental Group document.
1.50	345	PJM. Cost does not include ROW.
1.20	500	Seppa 1999 estimate, capital cost only.
1.06	230	Dominion estimate, 5 mile 1035 MVA capacity line with steel towers. Includes $0.485 million per mile for ROW.
0.94	230	Double circuit, 16-mile line. APS transmission.
0.92	345	Single circuit. National Council on Electricity Policy.
0.70 to 1.10 plus	115	Steel pole / tower. Institute for Sustainable Energy.
0.90	345	H-frame pole. Institute for Sustainable Energy.
0.90	345	Seppa 1999 estimate, capital costs only.
0.85	230	PJM. Cost does not include ROW.
0.70	138	PJM. Cost does not include ROW.
0.70	115	Laminated wood or steel pole. Institute for Sustainable Energy.
0.60	115	Wood pole H-frame. Institute for Sustainable Energy.
0.54	138	Double circuit. National Council on Electricity Policy.
0.48	230	Seppa 1999 estimate, capital costs only
0.39	138	Single circuit. National Council on Electricity Policy.

Source: JLARC staff compilation.

Table 3: Ratios for 230 kV Underground to Overhead Transmission, 2005 and 2006 Dominion Estimates

Cost Ratios, Underground to Overhead	Cost Assumptions or Type of Cost	Year
9.7	Initial installation costs, use of HPFF underground cable.	2006
9.5	Life cycle costs, HPFF underground cable.	2006
7.7	Initial installation costs, HPFF underground cable.	2005
7.5	Life cycle costs, HPFF underground cable.	2005
7.4	Life cycle costs, XLPE underground cable.	2006
7.1	Initial installation costs, XLPE underground cable.	2006
6.3	Life cycle costs, XLPE underground cable.	2005
6.1	Initial installation costs, XLPE underground cable.	2005

Note: Information sorted from high to low based on the ratio of underground to overhead cost. Where the ratio is a range, the mid-point of the range is used in sorting from high to low.

Source: JLARC staff analysis of Dominion data.

Table 4: Ratios of Underground to Overhead Costs, No Specific kV Level Given

Cost Ratios, Underground to Overhead	Cost Assumptions or Type of Cost	Information Source	Year
15 to 25		UK TSOs, cited by ICF consulting	2004
10 to 25		Union of the Electricity Industry (Eurelectric)	2005
15.3	Capital cost only, 1,700 MVA circuit	National Grid, cited by ICF	1996
14		Ofgem (UK reg agency), cited by ICF	2004
10 to 15	Cost of high-voltage line installation	Paper, Demetrios Tziouvaras	2005-06
11.8	Capital plus low load loss cost, 1,700 MVA circuit	National Grid, cited by ICF	1996
10 to 12		ETSO, cited by ICF	2004
5 to 15	Cost range indicated on web site	Florida Power and Light	2006
5 to 15	General range given	Idaho Power, web site FAQ sheet	2006
8 to 10	Cost of copper has gone up, increasing the ratio	Burns & McDonnell transmission staff	2006
4 to 10	General range given	Wisconsin Public Service Commission	
6.9	Capital cost plus high load loss cost	National Grid, cited by ICF	1996
3 to 10	Capital cost, general range	USDA Rural Development staff	2006
2 to 10	Broad range	Burns & McDonnell	
2 to 10	General range given	Georgia Electric, website document	2006
4	Single circuit lines	American Transmission Company	2003

Note: Information sorted from high to low based on the ratio of underground to overhead cost. Where the ratio is a range, the mid-point of the range is used in sorting from high to low.

Source: JLARC staff compilation.

Table 5: Ratios of Underground to Overhead Costs—Transmission at 115 to 230 kV (Sources Other Than Dominion)

Kilovolt (kV) Level	Other Cost Notes / Assumptions	Information Source	Cost Ratios, Underground to Overhead
115	Underground double circuit versus wood pole H frame	Institute for Sustainable Energy	6.7 to 9.8
	Colorado projects	USDA Rural Development	4 to 6
	Underground single circuit versus wood pole H frame	Institute for Sustainable Energy	3.7 to 5.8
	Underground double circuit versus steel pole	Institute for Sustainable Energy	3.6 to 5.4
	Underground single circuit versus steel pole	Institute for Sustainable Energy	2.0 to 3.2
132	Total installed cost	Orton Consulting Engineers Int'l	5.7
	Lifetime cost	Orton Consulting Engineers Int'l	2.6
138	Cost without terminals.	Wisconsin Public Service Commission	5.1
	Overhead proposal is double circuit steel poles	Appalachian, in the *Roanoke Times*	3
110 to 219	*Single value of 7, with range from 3.4 to 16*	*CIGRE, as cited by the Commission of the European Communities (CEC)*	7
150 / 200	Not stated	ESB Nat. Grid, Ireland, cited by ICF	7.7
	150 kV	Europowercab, cited in CEC report	4.5
150 / 220	Not stated	Terna, Italy, cited by ICF	5
	Not stated	Statnett, Norway, cited by ICF	4.5
	Not stated	RTE, France, cited by ICF	1.6 to 3
225 / 230	225 kV	Europowercab, cited by CEC	7.5
	225 kV, installation cost	Orton Consulting Engineers Int'l	5 to 10
	Experts on behalf of Loudoun County, 230 kV	Torben Aabo (2004) & Gerry Sheerin (2005)	4.2 & 4.4
	230 kV double circuit lines	Ontario Power Authority	3.7 to 5.1
	225 kV	ICF Consulting	3

Note: Information sorted from high to low by kV level first, and then by the cost ratio. Where the kV level or the cost ratio is expressed as a range, the mid-point of the range is used in sorting from high to low.

Source: JLARC staff compilation.

Table 6: Ratios of Underground to Overhead Costs—Transmission at Above 230 kV

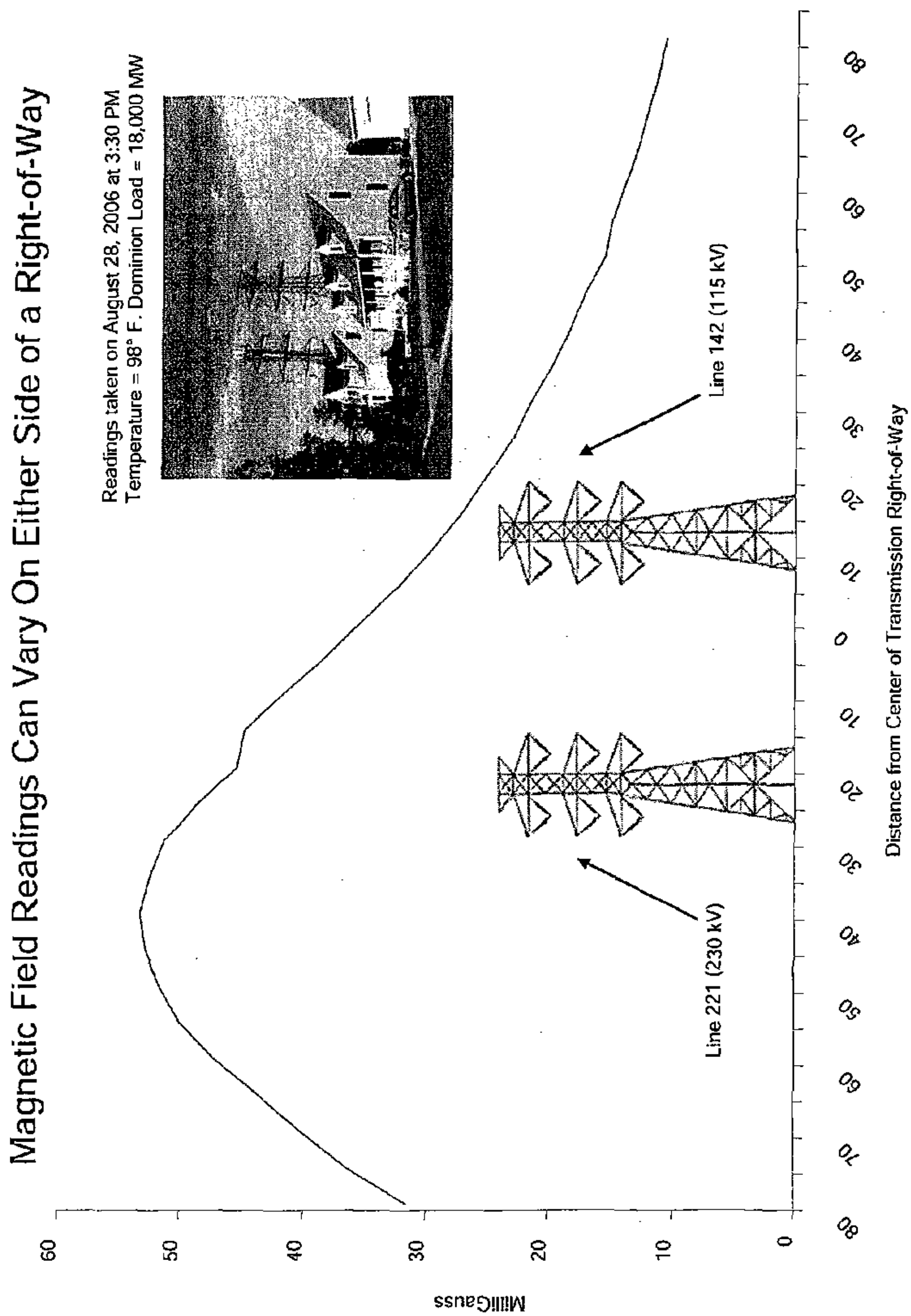
Ratios for Transmission at Above 230 kV			
Kilovolt (kV) Level	**Other Cost Notes / Assumptions**	**Information Source**	**Cost Ratios, Underground to Overhead**
220 to 362	Single value of 13, with range from 5.1 to 22.1	CIGRE, as cited by the Commission of the European Communities (CEC)	**13**
275	Double circuit	SHETL, cited by Highland Council	**12 to 15**
345	SCFF single circuit compared to H-frame	Institute for Sustainable Energy	**8.8**
	XLPE single circuit compared to H-frame	Institute for Sustainable Energy	**7.1**
	Ratio given as part of discussion of proposed 345 kV line	American Transmission Co. staff	**7.0**
	HPFF single circuit compared to H-frame	Institute for Sustainable Energy	**6.2**
	SCFF single circuit compared to steel pole	Institute for Sustainable Energy	**3.6 to 4.6**
	Bethel-Norwalk, 2 miles of XLPE	Northeast Utilities	**3.2 to 3.8**
	XLPE single circuit compared to OH steel pole	Institute for Sustainable Energy	**2.9 to 3.8**
	HPFF single circuit compared to OH steel pole	Institute for Sustainable Energy	**2.5 to 3.3**
	Bethel-Norwalk, 10 miles of HPFF	Northeast Utilities	**2.5 to 2.9**
380 / 400	Not stated	REE, Spain, cited by ICF	**25**
	Not stated	National Grid, UK, cited by ICF	**15 to 25**
	400 kV double circuit line	SHETL, cited by Highland Council	**14 to 25**
	Not stated	RTE France, cited by ICF	**10 to 20**
	Not stated	UK Regulator OFGEM, cited by ICF	**14**
	Capital cost, 1 km 400 kV double circuit fluid-filled	The Highland Council	**12**
	400 kV	ICF Consulting	**10**
	Capital cost, 5 km 400 kV double circuit fluid-filled	The Highland Council	**9.5**
	Life cycle cost, 5 km 400 kV fluid-filled	The Highland Council	**9.1 to 9.3**
	Capital cost, 10 km 400 kV double circuit fluid-filled	The Highland Council	**8.9**
	Capital cost, 1 km of 400 kV double circuit XLPE	The Highland Council	**8.9**
	Not stated	APG, Austria, cited by ICF	**8**
	Not stated	Terna, Italy, cited by ICF	**8**
	400 kV	Europowercab, cited by CEC	**7.5**
	400 kV, installed cost	Harry Orton	**5 to 10**
	Not stated	GRTN, cited by ICF	**5 to 8**
	Not stated	Fingrid, cited by ICF	**5 to 8**
	Life cycle cost, 5 km line, 400 kV, XLPE versus OH	The Highland Council	**7.2 to 7.6**
	Not stated	Statnett, Norway, cited by ICF	**6.5**
	Capital cost, 5 km, 400 kV, double circuit XLPE	The Highland Council	**6.4**
	380 kV, lifetime cost	ICF report on Italian regulated tariff	**5.9**
	Capital cost, 10 km, 400 kV double circuit, XLPE	The Highland Council	**5.8**
	Estimate for 400 kV project	ICF report, Beauly Scotland line	**5**
	400 kV project in Denmark	ICF Consulting	**4.5**
500	Range of ratios given in EIS for four 500 kV projects	U.S. DOE EIS documents	**10 to 16**
363 to 764	Single value of 20, with range from 14.6 to 33.3	CIGRE, as cited by the Commission of the European Communities (CEC)	**20**

Note: Information sorted from high to low by kV level first, and then by the cost ratio. Where the kV level or the cost ratio is expressed as a range, the mid-point of the range is used in sorting from high to low.

Source: JLARC staff compilation.

Appendix

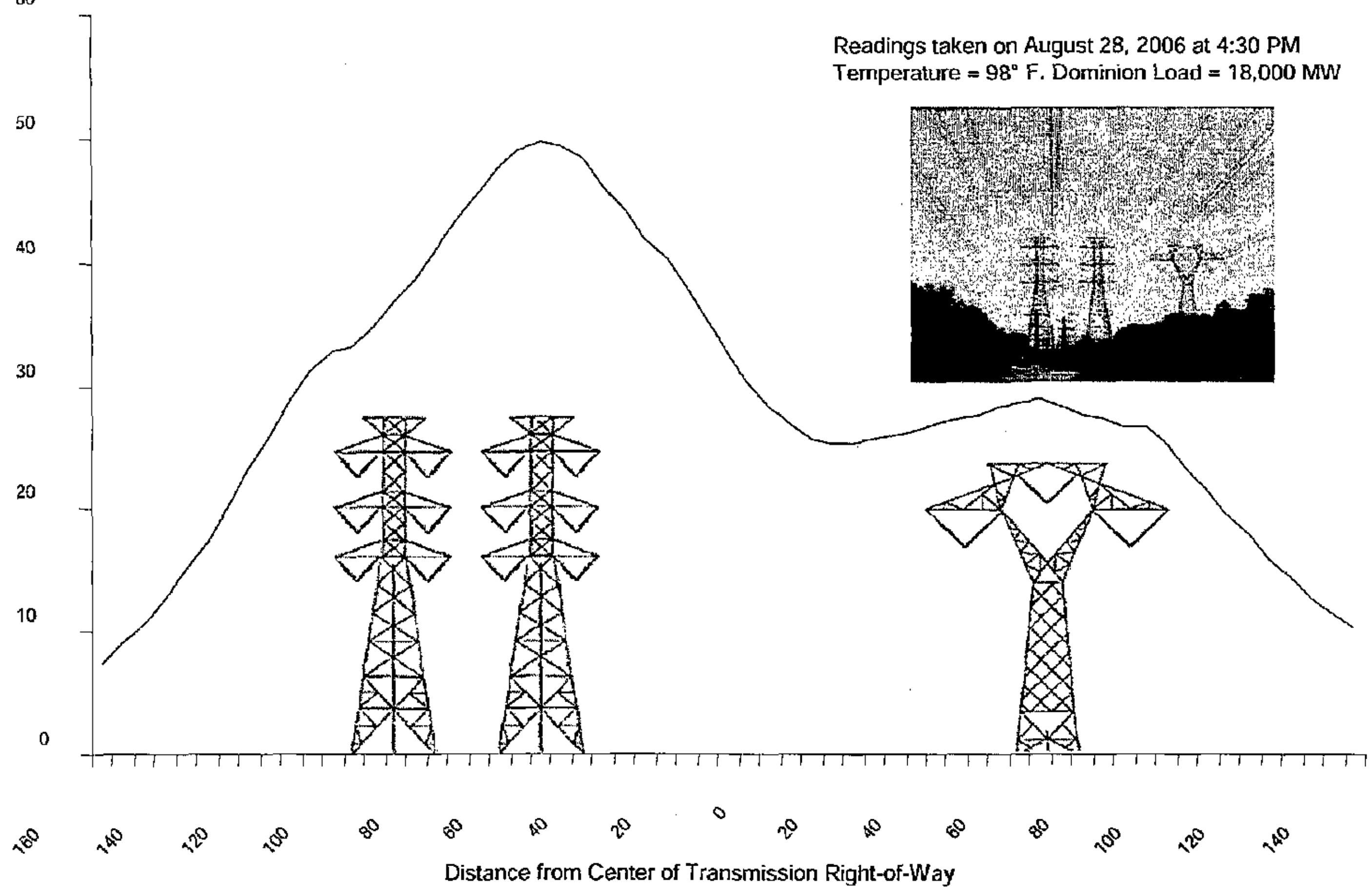
F Magnetic Field Readings



Magnetic Field Readings on Northwest – Mountain Road Right-of-Way, Henrico County

Source: JLARC Staff measurements, taken with Teslatronics Model 70 Triaxial milliGaussmeter, provided and calibrated by Dominion Virginia Power

Magnetic Field Levels Can Be Lower Around Higher-Voltage Transmission Lines



Magnetic Field Readings on Midlothian-Carson Right-of-Way, Chesterfield County

Source: JLARC Staff measurements, taken five feet above ground with Teslatronics Model 70 Triaxial milliGaussmeter, provided and calibrated by Dominion Virginia Power

Appendix

G Unoccupied Transmission Corridors Owned by Dominion Virginia Power

Pender /Oakton UG R/W – 24' permanent underground r/w in Fairfax County that extends from Pender Substation to the proposed Oakton substation site.

Fredericksburg / Quantico R/W – Company owns a 100' wide transmission r/w in Stafford County that has been abandoned due to re-routing of the line (252/ 29). The original route crosses residential properties and is currently used by Distribution. There are currently no transmission structures on this corridor.

Ox / Occoquan / Pohick / Van Dorn R/W – Company acquired r/w in the 1970's in Woodbridge but did not construct transmission line because Company could not justify a new independent right-of-way until the existing r/w was developed to its maximum capability. It does not appear that all acquisitions for this line were obtained.

Stafford / Elmont / Loudoun – Company acquired a 500' width r/w for a portion of the corridor and will only require a 150' width r/w. Portions of the 500' width r/w have been quitclaimed but the Company has maintained 150' for future use. The Company also acquired a 335' r/w for approximately 11.6 miles in this corridor, which has not been compromised by quitclaims.

Old Church / Chickahominy – Portions of this r/w have been acquired. Real Estate Department is actively acquiring remaining parcels.

Landstown / West Landing – Portions of this r/w have been acquired. Real Estate Department is actively acquiring remaining parcels.

Hayes / Yorktown – R/W from Hayes Substation to Yorktown, including 120' underground r/w across the York River, was acquired in 1985-86. Proposed line has not been constructed.

Joshua Falls / Ladysmith T/L – Company purchased 20 acres for transmission r/w in a residential subdivision in Louisa County to ensure its ability to extend the line. Project was initiated in 1992 but was delayed because of coordination issues with AEP and required regulatory approvals.

Possum Point / Weaver Road T/L – 225' Corridor in Prince William County, Virginia.

Richmond / Portsmouth T/L (Locks / Centralia) – 100' Corridor currently used by Distribution.

Appendix

H Agency Responses

As a part of the extensive validation process, State agencies and other entities involved in a JLARC assessment effort are given the opportunity to comment on an exposure draft of the report. Appropriate technical corrections resulting from comments provided by these entities have been made in this version of the report. This appendix includes written responses from the State Corporation Commission and Dominion Virginia Power.

MARK C. CHRISTIE
CHAIRMAN

THEODORE V. MORRISON, JR.
COMMISSIONER

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STATE CORPORATION COMMISSION

November 7, 2006

Philip A. Leone, Director
Joint Legislative Audit and Review Commission
Suite 1100, General Assembly Building
Capitol Square
Richmond, Virginia 23219

Dear Dr. Leone:

The Virginia State Corporation Commission ("SCC") thanks you and the JLARC Staff for the opportunity to review the Exposure Draft ("Exposure Draft" or "Draft") of your report entitled *SCC Review of Underground Electric Transmission Lines* dated October 31, 2006.

The SCC Staff has suggested several technical and clarifying changes to the Draft, and these have been furnished to your Staff, via e-mail. Please do not hesitate to contact us should there be any questions regarding these changes or if you need any further documentation or clarification.

During the past several months, the SCC and its Staff were pleased to assist JLARC and its Staff in the course of its study of electric transmission line undergrounding pursuant to House Joint Resolution 100 approved by the 2006 Session of the Virginia General Assembly. We commend this study team for its thoroughness in exploring this technically and legally complex topic.

The Exposure Draft explores many issues and sub-issues associated with the SCC's review of utilities' transmission line cases. In response to your invitation to do so, we offer several brief comments on the draft. In the main, these comments concern practice and procedure before the SCC in the context of these cases; the draft's legislative proposal concerning transmission line need analysis replication by the SCC Staff; and the draft's legislative proposal concerning quantification of environmental and other externalities in the Commission's review of transmission line applications.

Procedures and practice before the Commission.

First of all, the SCC and its Staff are sensitive to the impact of any proposed electric transmission line on the communities through which a line route is proposed. Consequently, and beyond requiring the applicant utility to comply with the notice requirements contained in § 56-46.1, the SCC makes every effort to establish and implement proceedings that maximize participation by homeowners and landowners along a proposed line route.

Moreover, through both the direct-mailed landowner notices and the public notices of proposed line routes given by the applicant utility pursuant to § 56-46.1 of the Code, affected homeowners and landowners are informed that they have the opportunity to express their views and concerns as public witnesses (through both live testimony and in written comments). Thus, citizen participation in these proceedings is encouraged and facilitated to the fullest extent possible. To that end, the Commission conducts public hearings in or near communities affected by proposed construction as a matter of standard practice.

The Exposure Draft states that the records in transmission line cases are generally developed by a hearing process built on the rules of evidence. Draft at 45-46. We would emphasize, however, that the Commission is in a "legislative" (versus judicial) mode when it conducts transmission line cases, and thus the rules of evidence are greatly relaxed to ensure that all information that may be useful to the Commission is introduced and made part of the record. This is particularly so as regards comments, testimony and other information offered by public witnesses for the Commission's consideration.

Every utility proposing to construct a transmission line has the statutory burden imposed by the Virginia General Assembly, to establish, through competent, probative evidence that such a line is needed (§§ 56-265.2 and 56-46.1), and that that the proposed routing will minimize adverse impact on "scenic assets, historic districts, and environment of the area concerned." § 56-46.1. This burden remains upon the applicant throughout the entire proceeding. Concurrently, the SCC has a statutory obligation to ensure that any such line proposed will be constructed in an "economical, expeditious and efficient manner." § 56-234.3. Thus, Virginia's electric utilities must do far more than simply file an application with this Commission to obtain approval of a proposed transmission line. They must satisfy the requirements of the laws of the Commonwealth described above, as administered by this Commission.

We also emphasize that the SCC's hearing examiners assigned to these cases do not limit the development of the evidentiary record in transmission line cases simply to testimony and exhibits offered and admitted in the SCC's courtrooms. For example, in a recent transmission line case[1] the hearing examiner assigned to that case traveled to Loudoun County on three separate occasions to view primary and alternate line routing proposals, and did so in the company of affected property owners and/or their representatives. The Commission itself exercises final oversight authority concerning the development and completeness of evidentiary records in every case before it. The Commission can, and has, directed hearing examiners to conduct additional evidentiary proceedings in order to ensure the completeness of the evidentiary record in some cases.

Thus, transmission line dockets before the Commission are designed to provide the fullest possible procedural and substantive protections for landowners and residents in the vicinity of proposed transmission lines.

Role of the Commission Staff in Transmission Line Cases.

The Exposure Draft recognizes the role of the Commission Staff in these cases—principally as a source of information and expertise on significant issues affecting the public interest. In the recent case involving a line proposed by Dominion Virginia Power to be sited in Loudoun County[2], for example, the Commission's Staff offered the pre-filed written testimony, and live testimony of a member of the Commission Staff who holds degrees in electrical and electrical power engineering. His testimony provided an assessment of the need for the proposed transmission line and issues associated with its siting. This testimony reflects the historical role that the Commission Staff has played in these cases, i.e., to assist the Commission in its development of the evidentiary record in such cases.

We note the Exposure Draft's recommendation that the Commission "acquire the resources and information necessary to replicate utility load projections, load flow studies and contingency analyses in every transmission line case." The recommendation is directly related to the Exposure Draft's conclusion that "the commission does not have the internal computer resources necessary to independently verify the reliability models used to justify new transmission lines." The Draft goes on to conclude that with the requisite analyses enabled by such new resources, the SCC could independently verify the backdrop for a utility's opposition to undergrounding a transmission line on the basis of reliability concerns. Draft at 136.

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1 *Application of Virginia Electric and Power Company for a certificate of public convenience and necessity for facilities in Loudoun County: Pleasant View – Hamilton 230 kV Transmission Line and 230 kV-34.5 kV Hamilton Substation,* Case No. PUE-2005-00018.

2 Id.

Such a recommendation, as drafted, would impose significant costs on the Commission. Beyond costs, however, there is the larger issue of creating meaningful information via replication of Virginia utilities' reliability analyses backing transmission planning and siting applications. Increasingly, the "modeling" for major transmission lines reflects transmission planning at the regional level. Virtually all of Virginia's investor owned utilities are members of PJM. In fact, Regional Transmission Entity participation by Virginia's transmission-owning utilities is directed by § 56-579 of the Virginia Electric Utility Restructuring Act.

Thus, the future transmission needs and requirements of Virginia's transmission-owning utilities reflect not only reliability issues in the Commonwealth of Virginia, but also the needs of the entire PJM footprint in the states now interconnected to Virginia through this regional transmission organization. Additionally, this regional planning process may increasingly focus in the future on economic, as well as reliability, issues associated with transmission improvements allowing greater access to lower-cost generation facilities.

At this time, neither the Commission or its Staff could replicate PJM's reliability and economic modeling implicit in its regional transmission expansion planning processes. Such modeling depends on inputted data from utilities throughout the 14 state region that PJM serves, not just from Virginia utilities. Moreover, it is impossible to know whether the Staff would be permitted access to the proprietary system data of all of these utilities—data that would be essential to conduct (or replicate) such load flow and contingency studies.

With respect to those cases that fall outside regional transmission planning conducted by PJM, the Commission Staff would, consistent with past practice in all transmission line cases, explore and analyze applicant utilities' assertions of need through (i) meetings between utility representatives and the Commission Staff, (ii) review and analysis of the utilities' applications, as filed, and (iii) discovery conducted by the Staff and other parties subsequent to applications' filing. Need-related information and data developed through this process has historically provided the Commission Staff sufficient information to review utilities' needs analysis offered in support of transmission line applications. As and when needed, the Commission Staff has employed consultants to assist it in analyzing proposed transmission lines of unusual length or complexity.

In summary, the Commission believes that replicating utility load projections, load flow studies, and contingency analyses should be done, if at all, on a case-by-case basis, and then only when the time invested and costs associated with doing so would produce information reasonably necessary to the Commission's determination of need for a proposed transmission line.

Quantifying Externalities.

The Exposure Draft correctly reports that that the SCC does consider costs—as it must by statute—in its assessment of a proposed transmission line, and any proposed construction or routing alternatives. The Draft also emphasizes that the SCC does not currently quantify costs external to the construction and maintenance costs of a proposed transmission. However, and as noted in the Draft, the SCC *does* consider these costs from a qualitative viewpoint, and gives full consideration to any qualitative evidence offered by the parties to a transmission line proceeding.

Specifically, to the extent that properties—including, significantly, homes—are affected by a proposed transmission line and its routing, the Commission does consider these impacts in its overall consideration of a proposed transmission line. As noted in the Draft, the Commission has frequently directed modifications to utilities' proposed transmission line routing in an effort to mitigate the impact on property owners.[3] For example, in conjunction with a transmission line sited in Loudoun County,[4] the Commission approved a routing along a portion of the W&OD Trail to avoid two subdivisions.

In this regard, we note that the Exposure Draft recommends, for consideration, potential legislation that would direct the Commission to "indicate which cost factors should be consistently addressed whenever the Commission is required to approve the construction of any electric utility facility, and to modify Commission policies and procedures, accordingly. Cost factors that the Commission should consider include (A) the monetary effect of an electric facility on the value of land and structures within and immediately adjacent to the proposed location or corridor...." Draft at 141. In short, this recommendation is suggesting legislation requiring the Commission to quantify the externality of property value impact, and then taking that into consideration as part of the costs of a transmission line.

Concerning that proposal, it is our view that adopting such legislation would effectively mandate an enlargement of the Commission Staff to include qualified real property appraisers for

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3 In addition to alternative routes, other methods to reduce visual impact may arise in proceedings. These include: height of the line's supporting structures (towers); structure design (single shaft versus lattice); structure material (galvanized versus self-protecting rust), tower location, use of topography to minimize visibility, type of conductor (reflective versus non-specular); use of natural visual barriers (trees).

4 *Virginia Electric and Power Company d/b/a Dominion Virginia Power - For a certificate for facilities in Loudoun County: Beaumeade-Beco 230 kV Transmission Line and Beaumeade-Greenway 230 kV Transmission Line,* Case No. PUE-2001-00154.

these cases, or require the Commission to make substantial investments in retaining independent experts to assist the Staff for the purpose of quantifying these property value impacts. Procedurally, this represents a substantial departure from current practice before the Commission where only those parties with an interest in quantifying property value impacts in these cases do so—frequently through public witness testimony, and often through real estate experts. Moreover, how such quantification should or could be weighted as part of the Commission's considerations is not addressed in this recommendation, or the draft, generally.

In our September 29, 2006, letter to you, we, *inter alia,* responded to your question about the Commission's view of quantifying environmental externalities. A copy is attached for convenient reference. In that letter, we made clear, however, that should the General Assembly direct the incorporation of quantified environmental externalities into the regulatory process, the Commission would carry out the law. In the meantime, however, we do not believe we currently possess statutory authority to do so.

We also wish to emphasize that until any such change in the law, the Commission will continue to do what it has done historically, and that is to take land owners' and homeowners' concerns about property value impacts of proposed transmission lines into consideration when reviewing the proposed construction and siting of transmission lines. Moreover, the Commission will continue to do everything in its power to reasonably mitigate the impacts of proposed electric transmission lines

In summary, we appreciate the opportunity to respond to the Exposure Draft. Please let us know if we can be of any further assistance to you, the members of your Staff, or the legislative members of JLARC.

Sincerely,

Mark C. Christie

Mark C. Christie, Chairman
State Corporation Commission.

MCC/nel
Attachment

MARK C. CHRISTIE
CHAIRMAN

THEODORE V. MORRISON, JR.
COMMISSIONER

JUDITH WILLIAMS JAGDMANN
COMMISSIONER

COMMONWEALTH OF VIRGINIA

JOEL H. PECK
CLERK OF THE COMMISSION
P. O. BOX 1197
RICHMOND, VIRGINIA 23218-1197

STATE CORPORATION COMMISSION

September 29, 2006

Philip Leone
Director
Joint Legislative Audit and Review Committee
Suite 1100
General Assembly Building
Richmond, Virginia 23219

House Joint Resolution 100 Study

Dear Mr. Leone:

Attached are responses to the four written questions included in your letter dated September 22, 2006 regarding the above-referenced study. If, after reviewing the responses, you would like us to respond to additional questions and/or you or your staff wish to meet with us, we will be happy to do so.

Respectfully submitted,

Mark C. Christie

Mark C. Christie

Theodore V. Morrison, Jr.

Theodore V. Morrison, Jr.

Judith Williams Jagdmann

Judith Williams Jagdmann

* * *

1. *According to the Federal Energy Regulatory Commission (FERC), the federal Energy Policy Act of 2005 grants FERC the new responsibility of "supplementing state transmission siting efforts in national interest electric transmission corridors," or NIETCs. At this time, how does the Commission anticipate that the designation of any NIETCs in Virginia will affect the Commission's current role in transmission siting?*

The Energy Policy Act of 2005 (EPAct 2005) allows FERC to issue a permit for construction of transmission facilities in an NIETC in a number of instances. These include: (1) if the State does not have authority to approve the facilities; (2) if the State does not have the authority to consider interstate benefits of the facilities; (3) if the applicant does not qualify to apply to the State for construction authority; (4) if the State has withheld approval for more than one year after the filing of an application seeking approval or one year after the designation of the NIETC, whichever is later; and (5) if the State has conditioned its approval in such a manner that the proposed construction will not significantly reduce transmission congestion in interstate commerce or is not economically feasible (*see* EPAct 2005 § 1221(a)).

Under Virginia statutes, the Commission is required to find that the new line is "needed" (*see* Va. Code §§ 56-46.1 B and 56-265.2). In asserting that transmission facilities are "needed," applicants before the Commission have provided evidence to show that the new lines are necessary to provide reliable *intrastate* service to Virginia consumers. The Commission has not considered *interstate* needs to be dispositive in applying Virginia statutes on this matter. Evidence has been adduced, however, in particular cases involving interstate line construction as to the proposed line's overall system benefits, including those realized in Virginia, and nothing precludes the presentation of such evidence in subsequent cases.

In addition, it is not unusual for more than 12 months to pass prior to reaching a final resolution in complex transmission line proceedings before the Commission. These cases involve procedures such as published notice, direct notice to affected landowners and localities, receipt of written and electronic public comment, multiple rounds of discovery, multiple rounds of pre-filed testimony, recommendations from state agencies concerned with environmental protection, consideration of local comprehensive plans, local public hearings to receive testimony from public witnesses, evidentiary hearings to receive evidence and argument from formal participants, briefing, and reconsideration requests.

The above procedures, which are necessary to afford due process, also are not limited to one siting route, but may encompass the evaluation of multiple siting alternatives. Indeed, such indepth evaluation may reasonably lead to consideration of routes that are significantly different from those proposed by the applicant. The General Assembly has recognized this and, in such instances, has directed the Commission to cause notice of any such new route to be published and mailed the same as for the original routes and to give interested parties in the newly affected areas the same protection afforded those affected by the originally noticed routes (*see* Va. Code § 56-46.1 E).

The Commission will continue to fulfill its statutory obligations regarding applications requesting certificates of public convenience and necessity for the construction of transmission facilities – and will continue to provide the public participation and analyses directed by Virginia statutes (*see* Va. Code §§ 56-265.2 and 56-46.1). We obviously cannot speak as to how FERC, or applicants before the Commission, may attempt to invoke the new federal permit provisions contained in EPAct 2005.

* * *

2. *In the case of transmission line projects submitted for approval under the Utility Facilities Act and § 56-46.1, and for which responsibility for all or a portion of the costs of the project have been assigned by the PJM Board of Managers to utilities outside of Virginia, which utility or other party does the Commission anticipate would be responsible for any additional costs associated with mitigation activities the Commission requires as a condition of certification?*

The Commission's authority regarding construction of transmission facilities in Virginia extends to the "public utility" that files the application requesting a certificate of public convenience and necessity (*see* Va. Code §§ 56-265.1 and 56-265.2). Any requirements placed by the Commission on a certificate of public convenience and necessity, in the form of conditions or otherwise, must be met by the applicant.

* * *

3. *In the Final Order for Case Number PUE-1990-00070, the Commission stated that "environmental externalities should be dealt with from a broader perspective than utility ratemaking. Congress and the General Assembly are the proper bodies to provide this perspective." Does the Commission still maintain this opinion? If yes, is the Commission in a position to develop a sufficient record, at the request of the General Assembly, that would quantify externalities such as the*

potential impact of electric transmission lines on (A) human health and safety, and (B) the value of private property?

On March 27, 1992, the Commission issued a Final Order in Case No. PUE-1990-00070. This case was initiated by the Commission to investigate conservation and load management (CLM) programs of electric and natural gas utilities. The Commission explained that the "first critical question which we must address is which test or tests should be applied to judge whether a [CLM] program is cost effective." (1992 SCC Ann. Rep. at 263.) In this regard, the Commission found that environmental externalities should not be *quantified* in evaluating the costs associated with a CLM program: "We believe that it would be speculative, and thus contrary to our legal authority, to include adjustments in rates for external environmental factors." (*Id.* at 264.) The Commission found that it lacked statutory authority to increase rates based on offsetting quantitative environmental externalities and agreed with parties "who suggested that incorporation of environmental externalities should be dealt with from a broader perspective than utility ratemaking." (*Id.*) Thus, the Commission concluded that "Congress and the General Assembly are the proper bodies to provide this perspective. When and if we are directed by legislation to incorporate *quantified* environmental externalities into the regulatory process, we shall do so, of course." (*Id.* (emphasis added).) As there has been no statutory change on this matter, such analysis remains as Commission precedent on this question.

In that same Final Order, the Commission further explained the difference (for our regulatory purposes) between quantitative and qualitative environmental externalities: "This Commission clearly considers environmental factors in rendering our decisions, but these factors are taken into account from a *qualitative*, not quantitative, standpoint." (*Id.* (emphasis added).) As an example, the Commission cited Va. Code § 56-46.1. This statute directs the Commission to consider, in transmission line cases, factors such as the effect of the facility on the environment, adverse environmental impact, reports from state agencies concerned with environmental protection, local comprehensive plans, the effect on economic development, and adverse impact on scenic assets, historic districts and the environment of the area concerned.

In transmission line cases the Commission must rule based on the record before it – including the record developed on qualitative environmental externalities. In reference to undergrounding, in ruling on prior transmission line applications the Commission has explained its rejection of underground proposals as follows: "There is no evidence that benefits will accrue to the Company or its ratepayers which outweigh the increased costs and risk of reliability problems associated with the underground installation of a portion of the proposed transmission line." (*See* 1990 SCC Ann. Rep. 269; 2004 SCC Ann. Rep. at 350-351.)

The Commission has rejected alternative routes or alternative construction methods for which the benefits did not, in the Commission's evaluation of the evidence, outweigh the increased costs that would be borne by all ratepayers. Conversely, the Commission has also approved alternative routes that satisfy this analysis. In other words, the Commission has not approved alternative routes or construction methods that would (1) result in significantly increased costs for all ratepayers, but (2) benefit only a particular subset of ratepayers (by, for example, reducing environmental externalities for those particular ratepayers).

The Commission views the decision to have ratepayers in a service area pay for more expensive transmission line alternatives that do not benefit those ratepayers as a legislative policy decision. If the General Assembly enacts legislation speaking to that policy – such as directing the Commission on how to allocate those extra costs that provide specific benefits to particular, identifiable subsets of Virginians that are uniquely burdened by the line – the Commission will faithfully implement the same. As one example, we note that the General Assembly has permitted certain localities to create a special rate district to cover additional costs of constructing, operating, and maintaining certain transmission lines underground rather than overhead (*see* Va. Code § 15.2-2404).

In response to the final part of Question 3, above, the record in Commission proceedings is developed by all who participate, such as the applicant, respondents, Commission Staff, and public witnesses. If the General Assembly directs the Commission to quantify specific environmental externalities, the record will be built by those who choose to participate on such issue. As noted above, in transmission line cases the Commisson is required to consider all reports from state agencies concerned with environmental protection (*see* Va. Code § 56-46.1 A). The Commission's Staff currently would need to engage outside experts to address quantification of environmental externalities, unless those agencies charged with administering Virginia's environmental laws sponsor testimony quantifying environmental externalities.

* * *

4. *Are there any additional resources which would aid the Commission or its Staff in reviewing applications for transmission lines? For example, in the Staff report for Case Number PUE-2004-00062, Staff expressed uncertainty "whether, and under what circumstances, a utility could be directed to construct new generation." In that same case, the Hearing Examiner's report indicated that*

Staff would need to retain a consultant to perform the contingency analysis conducted by the utility.

In response to your first example, the Commission has never directed a public utility to build generation in lieu of constructing a transmission line. Current statutes do not explicitly give the Commission that authority. We also have not evaluated any practical or legal impediments that may thwart the statutory implementation of a forced-generation-in-lieu-of-transmission alternative.

As noted above, issues in Commission proceedings are developed, for example, by the applicant and by respondents (who are frequently, but not invariably, opposed to the applicant). The Commission's Staff is a participant in cases but does not always provide testimony on all issues raised in a case. The Commission would, on occasion, need to hire additional Staff or permit its Staff to engage outside experts to address thoroughly certain matters – such as performing detailed load flow modeling and contingency analyses in opposition to those presented by the applicant. The Commission has previously permitted its Staff to engage outside experts in various energy matters that present sufficiently complex issues to merit the devotion of additional resources.

* * *

Dominion Resources Services, Inc.
P.O. Box 26532, Richmond, Virginia 23261

Dominion

November 7, 2006

Mr. Philip A. Leone, Director
Joint Legislative Audit and Review Commission
Suite 1100
General Assembly Building
Capitol Square
Richmond, Virginia 23219

Dear Mr. Leone:

Dominion thanks JLARC for the opportunity to review the draft of your report on the policies and criteria used by the State Corporation Commission to evaluate the feasibility of undergrounding transmission lines.

We found the report to be objective and responsive to the issues presented by the General Assembly through its passage of House Joint Resolution 100.

Please contact us if we can be of further assistance.

Sincerely,

John D. Smatlak

John D. Smatlak
Vice President – Electric Transmission

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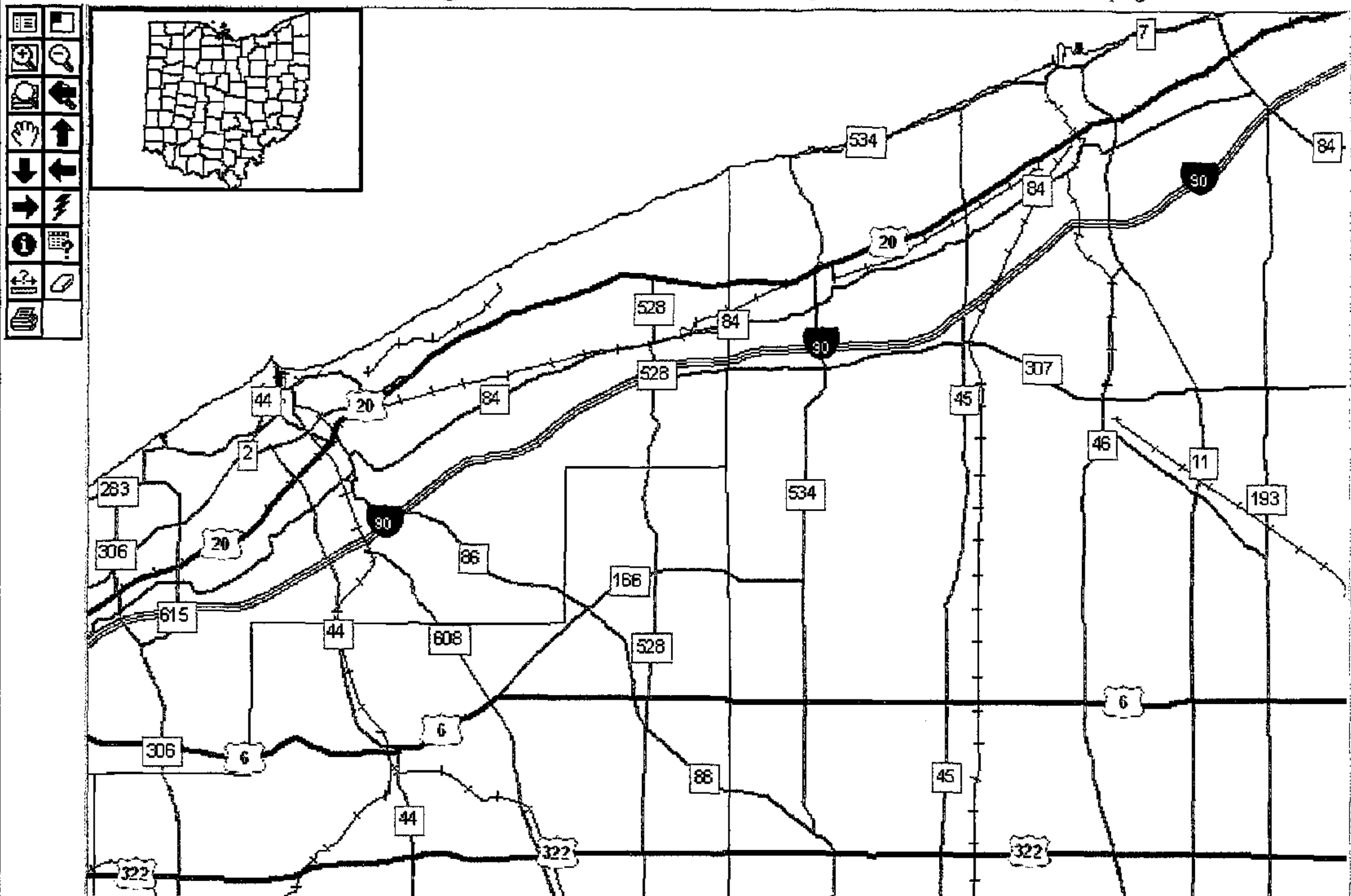

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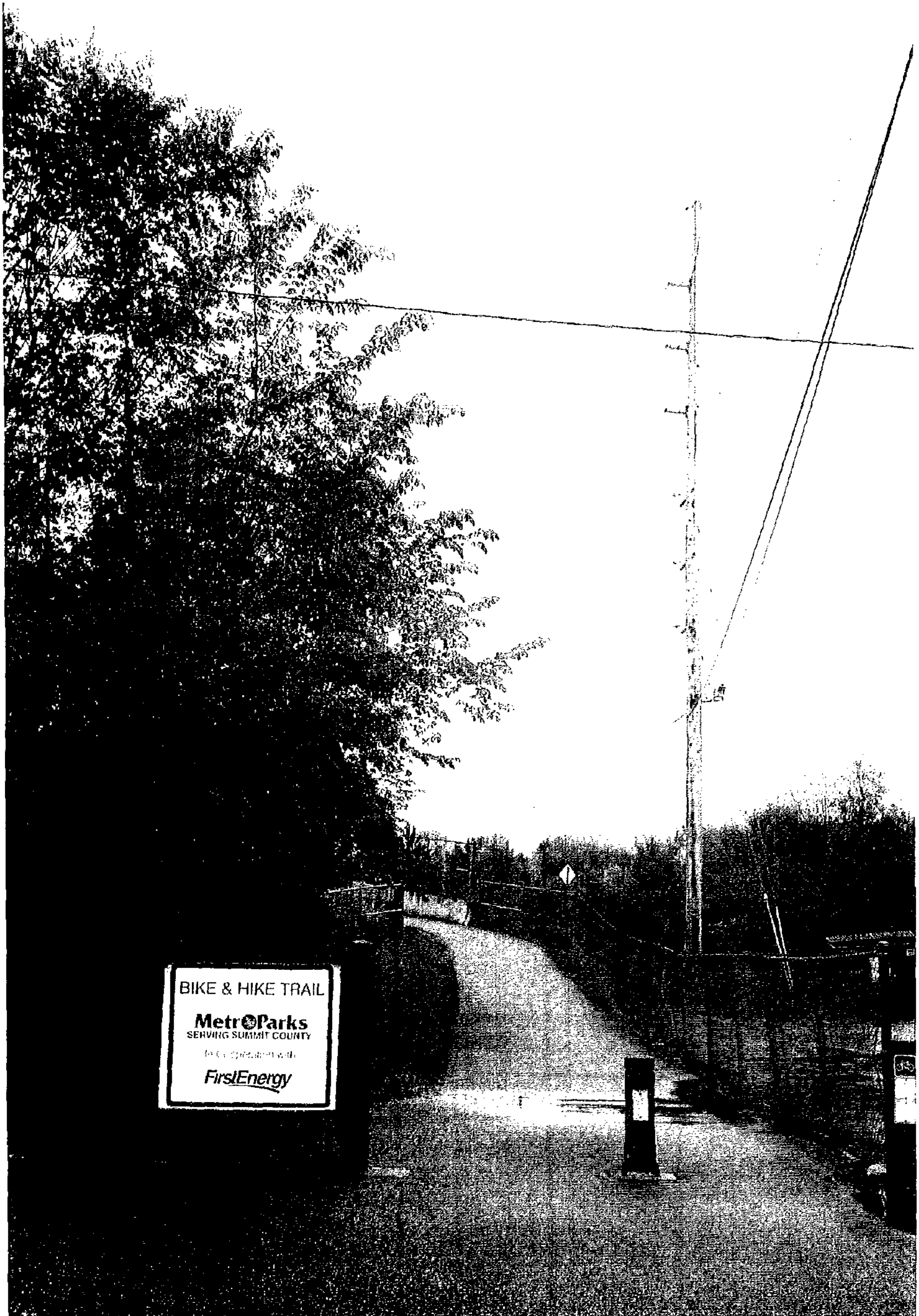
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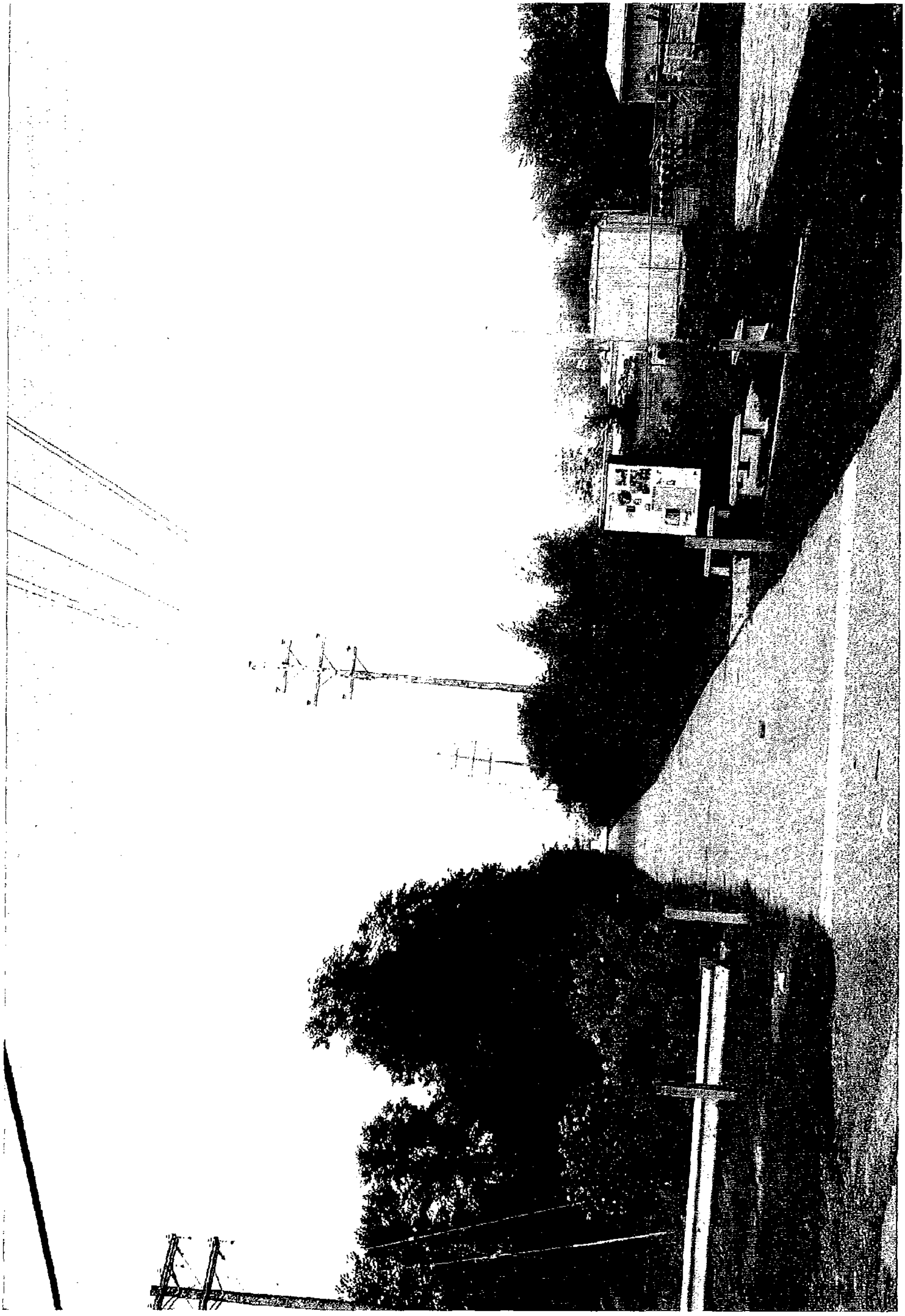


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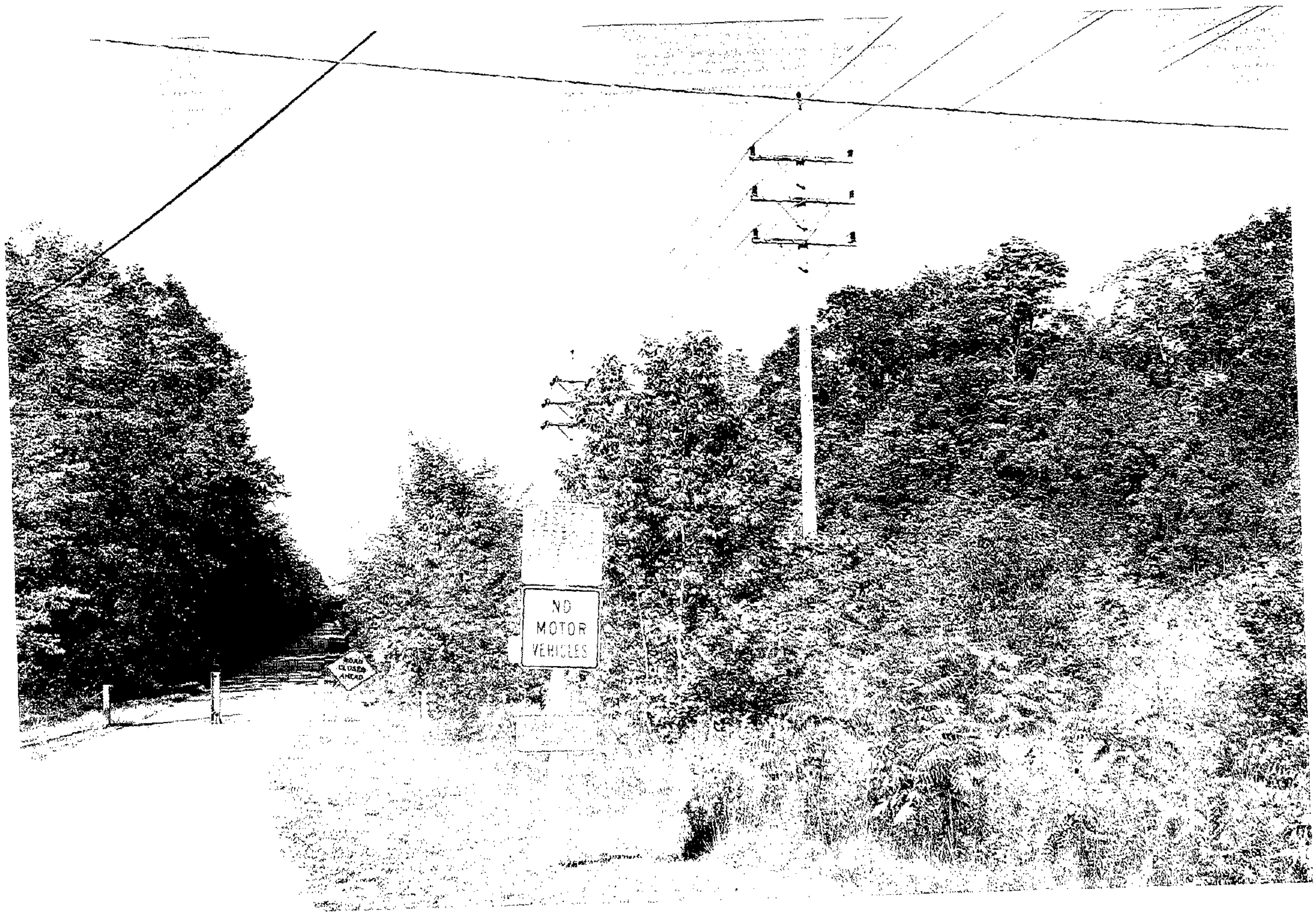
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4906-15-06 INTRODUCTORY MATERIAL

Section Summary

This section of the application provides a general description of the Rachel 138 kilovolt (kV) Transmission Line project proposed by The Cleveland Electric Illuminating Company (CEI). It also presents the proposed project schedule. The Rachel 138 kV Transmission Line will provide a strong source of power to the Rachel Distribution Substation, which is being installed to allow CEI to catch up with existing electrical load growth in the region. The proposed Rachel 138 kV Transmission Line project is required to serve the growing demands on CEI's electric distribution system in Geauga County. The proposed 138 kV Rachel transmission line will also improve reliability in the area by decreasing outages and improving voltage regulation. The Rachel 138 kV Transmission Line is a double circuit, 138 kV overhead transmission line that will be constructed on single steel poles. Two routes have been proposed for the transmission line. The preferred route is located in Claridon, Hambden and Chardon Townships of Geauga County. The alternate route is located in Claridon, Huntsburg, Montville and Hambden Townships of Geauga County. These routes were selected by CEI as part of a route selection study, which incorporated input from an environmental and engineering consulting firm, a Citizen Advisory Committee, elected officials and the public. The identified routes minimize, to the extent possible, overall impacts of the project on the environment and the community. As explained in other sections of the application, the technical features of the routes are similar, but the socio-economic and environmental features favor the preferred route, because a large portion of it utilizes the abandoned Baltimore and Ohio (B&O) railroad corridor. The preferred route also is more acceptable to more people in the community. CEI plans to place the Rachel 138 kV Transmission Line and the Rachel Distribution Substation in service in December 1997.

(A) Project Description

This application is for a certificate of environmental compatibility and public need for a double-circuit, 138 kV overhead electric transmission line proposed by CEI. The proposed transmission line will be located entirely within Geauga County in northeast Ohio. Depending on the route selected, the proposed transmission line will be either 8.9 or 9.9 miles in length. The proposed transmission line will be constructed on single steel poles using one 795,000 circular mil (795 kcmil) conductor per phase. The project will be referred to as either the proposed Rachel 138 kV Transmission Line project or the proposed project throughout this application.

Because the transmission line for the proposed project is greater than 125 kV but less than 300 kV, and the length of the line is greater than 2 miles but not greater than 10 miles, this application follows the format of a short form application as described in the Ohio Administrative Code (OAC), Sections 4906-15-06 through 4906-15-11. As such, the application presents a preferred and an alternate route. The application section numbers correspond directly to the OAC rules, which begin with 4906-15-06 - Introductory Material. For consistency, the page numbers are prefaced by the number of each section, and therefore the page numbers in this initial section do not start with 01-1, but rather 06-1.

(1) Summary Description

The proposed Rachel 138 kV Transmission Line project will connect the proposed Rachel Distribution Substation with the existing Mayfield-Ashtabula

138 kV Transmission Lines that run in a southwest-northeast direction through the northwestern portion of Geauga County. The proposed Rachel 138 kV Transmission Line will provide power to the proposed Rachel Distribution Substation, which will provide additional electric distribution capacity at the load center where power is needed. This will allow CEI to catch up with current needs and provide a margin for future growth.

The proposed Rachel 138 kV Transmission Line project is required to serve the growing demands on CEI's electric distribution system in Geauga County. The proposed project will also improve reliability in the area by decreasing outages and improving voltage regulation.

The proposed Rachel Distribution Substation will be located in Claridon Township, on the south side of Mayfield Road (US 322), approximately 2,400 feet east of the US 322 intersection with Old State Road (State Route (SR) 608). It will be located adjacent to the east side of CEI's existing Ruth Distribution Substation. Because the proposed Rachel Distribution Substation will be a distribution substation, it is not a part of this application. A description of the Rachel Distribution Substation has been included in Section 4906-15-08(B)(3) for informational purposes.

One preferred route and one alternate route are presented in this application for the Rachel 138 kV Transmission Line project. Both routes originate at the Rachel Distribution Substation in Claridon Township, and are entirely located within Geauga County. The preferred route is approximately 8.9 miles long, and is located in Claridon, Hambden and Chardon townships. It follows the abandoned B&O railroad grade corridor for approximately 4.7 miles, and the remainder traverses a cross-country route. The alternate route is approximately 9.9 miles long, and is located in Claridon, Huntsburg, Montville and Hambden Townships. It follows the abandoned B&O railroad grade corridor for approximately 0.9 miles, and the remainder traverses a cross-country route. Detailed descriptions of the proposed preferred and alternate routes are provided in Section 4906-15-06(A)(2). The locations of the routes are shown in figures 08-1A through 08-1C. Schematic cross sections of the routes are shown in Figure 08-2A through 08-2F.

The proposed transmission line would be constructed along either the preferred or the alternate route using single steel pole structures to support the six conductors and one shield wire that make up the two 138 kV circuits. Single steel pole structures would be used rather than lattice towers. The proposed conductor supports would use armless construction, wherever feasible. The conductors would be insulated from the poles using primarily polymer horizontal post or suspension insulators.

(2) Length and Location

Both the proposed preferred and alternate routes extend north from the proposed Rachel Distribution Substation and terminate at the Mayfield-Ashtabula 138 kV Transmission Lines that run in a southwest-northeast direction through the northwestern portion of Geauga County.

As shown on Figure 08-1A through 08-1C, the alignment of both the preferred and alternate routes does not follow a straight line from the proposed Rachel Distribution Substation site to the existing Mayfield-

Ashtabula 138 kV Transmission Lines. Rather, they make many turns and changes of direction in an effort to minimize, to the maximum extent possible, impacts on sensitive ecological features and the local community. The turns and changes were incorporated into the routes based on evaluations of ecological features in the study area and on discussions with the Citizen Advisory Committee, local officials and area residents. In some locations, the evaluations and discussions with the community indicated a common locations for the route; however, there are other locations where the evaluations and discussions with the community indicated divergent locations for the routes. Each such divergent location was closely reviewed to identify the most appropriate compromise for that specific location. The routes presented in this application represent the final output of that review. A description of why specific turns and changes of direction have been incorporated in the preferred and alternate routes is presented after the general description of each route given in the following paragraphs.

Preferred Route

The preferred route is approximately 8.9 miles long. As noted, it originates at the Rachel Distribution Substation, which will be located in Claridon Township, Geauga County, on the south side of US 322, approximately 2,400 feet east of the intersection of US 322 with SR 608. The Rachel Distribution Substation will be located adjacent to CEI's existing Ruth Distribution Substation.

The abandoned B&O railroad grade is located immediately west of the existing Ruth Distribution Substation. The majority of the former railroad right-of-way (ROW) is owned by the Geauga County Board of Commissioners. The existing railroad grade is located approximately in the center of the 100-foot wide abandoned railroad ROW. The railroad tracks, ballast, road crossing and bridges have been removed. The sub-ballast, earthwork, culverts and bridges crossing streams remain. Four parcels along the route are owned by private owners. The Geauga Park District has proposed converting the railroad grade into a bicycle path. The Geauga Park District has received funding for their project. The Ohio Department of Transportation has developed a preliminary design for the bicycle path, and currently is evaluating public input. At present, the bicycle path is planned to be constructed in 1997.

The preferred route follows and is predominantly located within the abandoned railroad ROW north and northwest for approximately 4.7 miles. The transmission line will parallel the railroad grade, with the foundations of the single steel poles being located approximately 14 to 18 feet east or north of the railroad grade within the abandoned railroad ROW. Because the transmission line will be constructed in close proximity to the existing railroad grade, the transmission line and the access road will be able to cross many of the existing streams, creeks, wetlands and other sensitive ecological areas with no or only minor earthwork and culvert extensions.

In following the former railroad grade, the preferred route will cross US 322, Stillwell Road, SR 608, Claridon-Troy Road and Taylor-Wells Road. In this area it will cross tributaries of East Branch Reservoir and the West Branch of the Cuyahoga River. The preferred route then trends north from the abandoned railroad grade approximately 6,000 feet west of the intersection of the abandoned railroad grade with Taylor-Wells Road. The route continues in an overall northerly direction from the abandoned railroad grade across Chardon-Windsor Road, G.A.R. Highway (US 6), and Woodin Road. In this area it will cross tributaries of Big Creek, Cutts Creek, and Jenks Creek. Approximately one-half mile north of Woodin Road, the preferred route makes a 90 degree turn to the west and continues across Brown Road. Approximately 2,000 feet west of Brown Road, the preferred route makes a 90 degree turn to the north and continues for approximately 1,700 feet. At this point it turns to the northwest and continues for approximately 400 feet, at which point it intersects the existing Mayfield-Ashtabula 138 kV Transmission Lines. In this portion of the route, the lines will cross tributaries of Jenks Creek and Big Creek. The preferred route would tap into the transmission lines approximately 1 mile northeast of the intersection of Robinson and Woodin Roads.

The alignment of the preferred route was selected for the following reasons:

Segment 1: Abandoned Baltimore & Ohio Railroad Right-of-way

From the Rachel Distribution Substation to approximately 6,000 feet west of the intersection of the abandoned B&O railroad grade with Taylor-Wells Road, the ROW of the preferred route is located on the ROW of the abandoned railroad. It is advantageous to use the corridor formed by the abandoned railroad grade of the former B&O Railroad because it is an existing corridor that, when it was constructed, modified land use and the ecological features of the area, and crossed existing creeks and streams with culverts or bridges. In addition, its previous land use has helped to limit existing nearby dense residential developments.

From a route alignment perspective, one issue under consideration was determining how close the proposed transmission line ROW should be to the abandoned railroad ROW. Alternatives under consideration were placing the transmission line either within or immediately adjacent to the abandoned railroad ROW. Placing the transmission line ROW next to the abandoned railroad ROW would place the foundation for the transmission line approximately 80 feet from the centerline of the existing railroad grade. Placing the transmission line ROW within the abandoned railroad ROW would place the foundations for the transmission line poles approximately 14 to 18 feet from the centerline of the abandoned railroad grade.

Locating the transmission line ROW on the abandoned railroad grade:

- Maximizes the distance from residential properties
- Maximizes the distance from area ponds
- Allows existing wetland, creek and stream crossings to be used to the maximum extent possible, therefore minimizing additional impacts
- Allows the existing clearing for the abandoned railroad grade and future bicycle path to be used for part of the clearing required for the transmission line ROW
- Allows a portion of the existing railroad ROW to be used as an access road.

Transmission lines, bicycle paths and other trails successfully occupy the same corridors in many parts of the United States. The Rachel 138 kV Transmission Line can be constructed to leave significant amount of vegetation below the transmission line; this will enhance the aesthetics of both the transmission line and the bicycle path.

Locating the transmission line ROW next to the abandoned railroad ROW maximizes the distance between the proposed bicycle path and the transmission line while keeping them both generally within a single corridor. While locating the transmission line ROW next to the abandoned railroad ROW widens the existing corridor, places the transmission line closer to residential structures, increases the impacts on streams, creeks, ponds and wetlands; and requires the removal of more vegetation.

Discussions with both the Citizen Advisory Committee and with local residents at the Open House meetings and by phone indicated a strong preference that the transmission line ROW be located on the abandoned railroad ROW. Because, the ecological impacts and many public comments favor locating the transmission line ROW in the abandoned railroad ROW, the ROW of the transmission line has been proposed to be located within the ROW of the abandoned railroad. In addition it has been located on the east and north side of the railroad grade because this appears to minimize the impacts on area ecological features while providing the most flexibility in jointly occupying the corridor with the proposed bicycle path.

EXHIBIT

My name is Chalmers Bennett. My wife, Mary, and I own a 47-acre farm at 11277 Madison Road, located on the east side of Rt. 528, just north of Chardon-Windsor Road, in Huntsburg Township. Our land is qualified for Current Agricultural Use Valuation, and is an Agricultural Land District parcel under the Ohio Farmland Preservation Act. It is part of the county's thousands of farm acres that will be adversely impacted if the proposed power line is constructed along the so-called "Preferred Route."

Many of my early recollections of my English-Irish father revolve around his yearning for a place in the country. The Great Depression had cost him a fruit farm in Berrien County, MI where he had planned to retire. Years later, still dreaming of retirement, and much closer to it, he bought a 92-acre fruit farm in Ashtabula County. Tragically, cancer prevented him from ever living there.

From Day One after Dad bought it, I spent all my summers working on that farm, learning to care for grapes and apples, make hay, tend livestock, and love the life. After high school and a brief stint at Ohio State, I returned to the farm, shortly to be joined by my new wife, Mary, and soon, a son. Dad's untimely death brought an end to our happy days of living on the land, since the settlement of his estate required the sale of his dream farm.

From the day we left that place, there was never a time that Mary (who has some very Irish McSweeny blood in her family) and I didn't dream dreams of finding our own good spot to make a home in the country. We realized that goal that when we purchased our Huntsburg home in 1982. The passing years have slowed our steps, and our good neighbor, Cal Varner, now farms our land. But we still derive immense pleasure from watching the Canada geese that nest at a nearby pond, the deer, foxes, wild turkeys, and even those pesky woodchucks that think they own the place.

They are quite true, you know, those words Margaret Mitchell puts in the mouth of Gerald O'Hara, "It will come to you, this love of the land. There's no gettin' away from it if you're Irish." Many here will tell you that this truism applies to more peoples than the Irish.

As I follow the course of this power line proposal, I find myself asking: "Who speaks for the land and the natural world it supports?" The answer is not clear.

The official stewards of this beautiful county, our Commissioners, speak the language of preservation to impress their constituency. However it is plain to this observer that their greater interest lies in growing Geauga County's tax duplicate by growing the county's industries, not Geauga County's livestock, corn, hay, oats, and soybeans.

On the other hand we have the Geauga County Park District whose leaders talk preservation of our shrinking open spaces when they have a levy on the ballot, but more often appear to see this place as a means to their own ends.

The upward spiral of pressure on the beautiful natural world of our county continues unabated. The land and the life it supports are too often seen not as they are, but as a commodity for human consumption: fish for catching, water for drinking, deer for hunting, and open land for the proliferation of housing developments, strip centers, big box retailers, and industrial growth.

There is a book, Aldo Leopold and the Ecological Conscience by Richard L. Knight and Suzanne Riedel, in which we are reminded that, "In conversations about public and private lands, it is appropriate to ask: Who speaks for the land? Who are its advocates? Who sees the land as an entity not only to own, but also to belong to? Who recognizes that along with ownership of the land comes responsibility to both the human and natural communities?"

I will never be half the farmer that Mike Youshak, my neighbor down the road, is. But I know that Mike will agree when I tell you that the land remembers the treatment it receives. If you work the soil when its condition is right, it will reward you with easy tillage and good crop returns. Work it when it is too wet, and you will fight clods seemingly forever. Run heavy equipment across your land at the wrong time, and the resulting compaction of the soil will inhibit tillage and reduce dollar returns from the field for many seasons. The land remembers; it also punishes misuse.

Geauga County's own Randy James, PhD, Professor and Extension Educator, Agriculture and Natural Resources, now retired, on April 23 of last year wrote a letter to the Ohio Power Siting Board in which he stated, "My Ph.D. is in soils and I know that it is extremely difficult to estimate how long a reduction in crop yield, (due to soil compaction, structural damage, changes in drainage etc.), may persist. The point is a small family farm may have to deal with the economic consequences of disrupting productive fields for many years."

One summer many years ago, Mary and I undertook as our vacation project to follow as closely as possible on today's highways the old Oregon Trail used from 1841 to 1869 by land-seeking pioneers. They trekked 2,170 miles westward for five or six months from the takeoff point at Independence, MO all the long way to Seaside, OR and Olympia, WA. Unfortunately *we* didn't have enough time to make it clear out to the Pacific shore. That was long ago, but I still recall vividly the thrill I experienced when we reached a spot where our modern highway actually crossed the old trail out on the Wyoming prairie. I pulled off the road, shut down the engine, and piled out to stand in the uncanny stillness of a hot afternoon and view deep ruts that extended from one horizon to the other, still there in the soil 139 years or more after the last wagon passed that way and the shouts of the drovers and the creak of the wheels had died out forever. The land remembers.

Who speaks for the land?

I have come here this evening to fulfill that obligation.

On behalf of the land I must tell all who hear my voice or read these words that, if this application is approved in its present form, the soil that is taken from its unwilling owners will always remember, and punish, what is done to it. We who will suffer the rape of our precious lands and be condemned daily to view the results will never forget, nor will we forgive what is done, those who have done it, and those who have condoned the action.

The Land Remembers

Wagon ruts on the old Oregon Trail

Oregon Trail, South Pass, Wyoming

EXHIBIT

Re: Proposed power line path through Geauga County Farmland

My name is Kathleen Binnig.

Our Historic Ohio farm at 17405 Thompson Road has been in our family since the **1830's.** Our land is in farm land preservation with the state of Ohio and is an agricultural district. Our 16+ acre wood lot has never been clear cut.

First Energy is seeking an easement along the western edge of our property for tree trimming, tree clearing, and for guy wires, which I assume will entail more tree clearing.

The townships seeking more power are Orwell and Middlefield.

Ohio revised code 4906.10 basis for granting or denying the application for the proposed power line path covers 8 points:

1. Need for the facility

Middlefield and Orwell still need more power. It might be more efficient to locate the power in one of those communities in the form of a local power plant. There would be less loss of energy and less chance of damage along lines.

In looking at Ohio Senate Bill 221, it suggests businesses should look into being "self generators", should study how to use energy more efficiently, and should look at alternative energy resources.

2. Probable environmental impact
3. Minimum adverse environmental impact

On the edge of our property alone, the proposed lines and clear cut would go through pristine farmland, through designated wetlands, would go over and near two clean creeks, and through never cleared woods. The 60 feet wide clear cut would not only destroy the present natural environment of the land, but would open our land to abuse by trespassers in ATVs, snowmobiles, etc.

4. Consistent with regional plans for expansion of electric power

I cannot speak to this point from personal knowledge, but if Orwell and Middlefield need more power for industry and development, looking at existing clear cuts further east, or building a local power plant near those two communities would seem to make more sense.

6. Serve the public interest, convenience and necessity

The proposed path of the power line does not serve the public interest, convenience, or necessity of the farmland it will mar.

We do not need more power.
We do not want our wetlands and creeks eroded or degraded.
We do not want our soil compacted or eroded.
We do not want to mow around guy wires.
We do not want open corridors for trespassers to have easy access to our land.
We do not want our woodlands, pastures, or croplands marred by a 60 foot clear cut.
We need to care for existing farmlands so we can eat in the future.

For power that is needed in Orwell and Middlefield, use a pre-existing corridor.

7. What impact will be on the viability as agricultural land in an existing agricultural district?

Farmland is not simply wide open space. The pasture land feeds animals and may be a source of cut hay. The woods may be heating the farm house. Selective cutting of trees is farm income. Croplands and gardens are in obvious use as food producers.

Personal impact on us: A fence row clear cut of trees, a creek crossed, a clear cut through the edge of our wood lot above another creek, guy wires and more clear cuts to work around, open access to trespassers, devalued property, scarred pristine farmland and natural places.

8. Maximum feasible water conservation practices

The proposed power line follows our west property line. In the path of the line is our west front pasture and the neighbor's land to the west of the pasture, Both are designated wetlands. The proposed line would also cross the creek that runs west to east in the front pasture.

When the proposed line goes through our and adjoining woodlots, it clear cuts above another clean creek in a ravine.

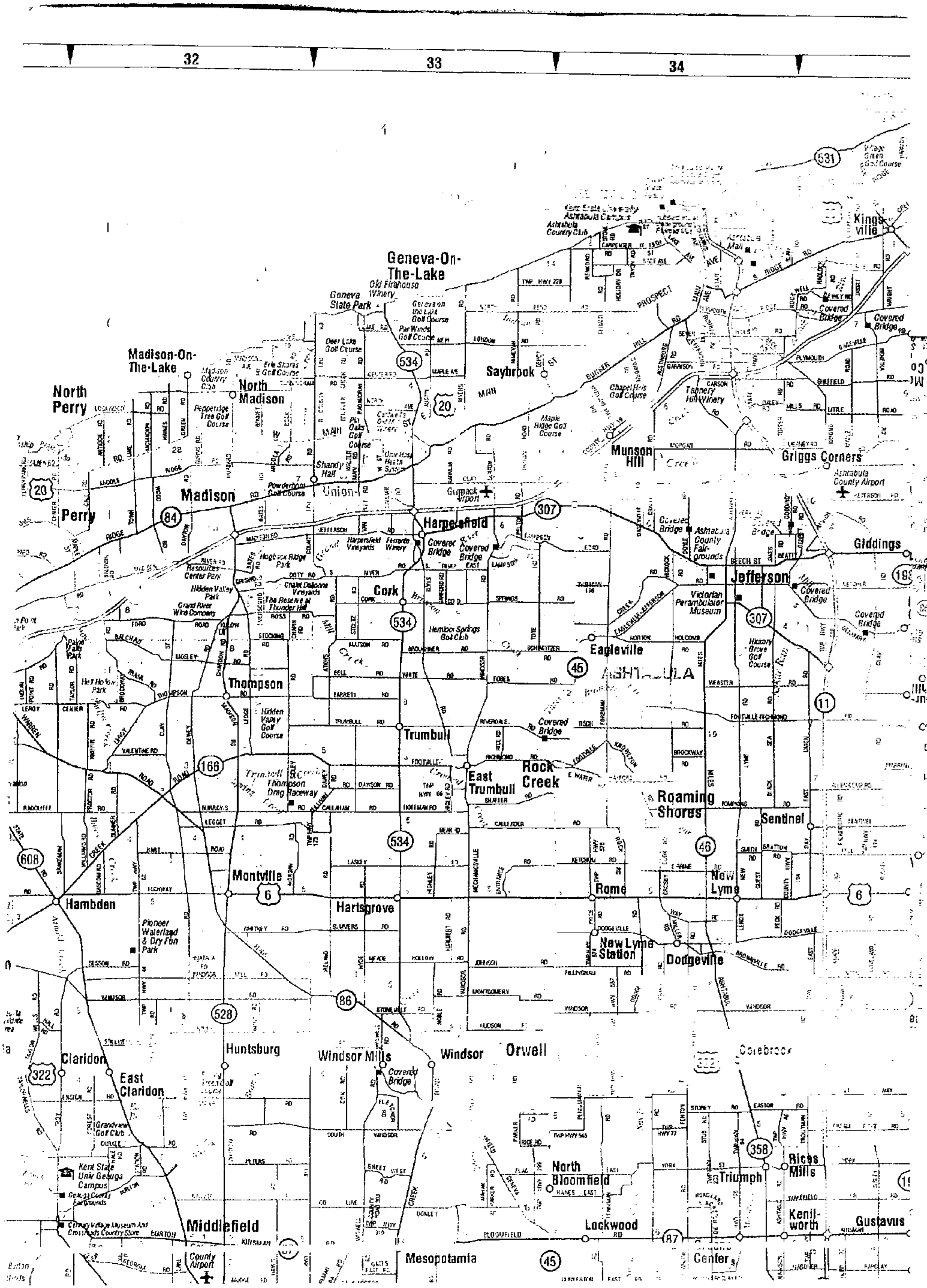
Disturbing the **natural wetlands** and clean creeks would not be good water conservation practice.

In conclusion:

We all need to eat. As we cover up farmland with subdivisions, factories, and businesses...As we abuse the land with poor environmental practices...Remember that, like oil and other natural resources, there is a limited amount of farmland on this earth.

There are existing open corridors - the railroad right of way east of Thompson that goes from Ashtabula to Lisbon, or Route 11. Orwell is East of Thompson and the entire proposed route. There is no reason to open a new corridor through farmland.

Sincerely,



32
33
34
Geneva-On-The-Lake
Geneva State Park
Madison-On-The-Lake
North Madison
North Perry
Perry
Madison
Saybrook
Kingsville
Ashtabula County Airport
Munson Hill
Griggs Corners
Harpersfield
Giddings
Jefferson
Cork
Eagleville
Thompson
Trumbull
East Trumbull
Rock Creek
Roaming Shores
Sentinel
Montville
Hambden
Hartsgrove
Rome
New Lyme
New Lyme Station
Dodgeville
Huntsburg
Windsor Mills
Windsor
Orwell
Claridon
East Claridon
North Bloomfield
Triumph
Rices Mills
Kenilworth
Gustavus
Lockwood
Middlefield
Mesopotamia
Thompson Drag Raceway
Victorian Perambulator Museum
Ashtabula County Fairgrounds
Kent State Univ Geauga Campus
Pioneer Waterland & Dry Fun Park

Access Geauga

Parcel #: 30-005600 **Routing #:** 30-01-03-00-064-00
Tax District: THOMPSON TWP-LEDGEMONT LSD
Location Add: 17405 THOMPSON RD
Owner: BINNIG MARK & KATHLEEN

Owner Address: 17405 THOMPSON RD
THOMPSON OH 44086
Mail Name: BINNIG MARK &
KATHLEEN
Mailing Address: 17405 THOMPSON RD
THOMPSON OH 44086
Deed Volume/Page: 1275/0379 **Class:** 117
Sub/Lot/Sect/Tr: LOT- 33
Acreage: 74.50

VALUATION	Tax Year: 2008	
	Market	Taxable
Land	$167,100	$58,490
Improvement	$72,700	$25,450
Total	$239,800	$83,940
CAUV	$20,630	$7,220

Sale Value: $0 **Sale Date:** 20080718
Yr Blt/Remodel: 1898/
Total Living Area: 1882 **Grade:** C 00

N

Tracy A. Jemison, AAS
County Auditor

"Inter-agency coordination benefiting the citizens of Geauga County"

Robert L. Phillips, P.E., P.S.
County Engineer

Scale 1:5627

Access Geauga

Parcel #: 30-005600 Routing #: 30--01-03-00-064-00
Tax District: THOMPSON TWP-LEDGEMONT LSD
Location Add: 17405 THOMPSON RD
Owner: BINNIG MARK & KATHLEEN

Owner Address: 17405 THOMPSON RD
THOMPSON OH 44086
Mail Name: BINNIG MARK &
KATHLEEN
Mailing Address: 17405 THOMPSON RD
THOMPSON OH 44086
Deed Volume/Page: 1275/0379 Class: 117
Sub/Lot/Sect/Tr: LOT- 33
Acreage: 74.50

VALUATION	Tax Year: 2008	
	Market	Taxable
Land	$167,100	$58,490
Improvement	$72,700	$25,450
Total	$239,800	$83,940
CAUV	$20,630	$7,220

Sale Value: $0 Sale Date: 20060703
Yr Blt/Remodel: 1868/
Total Living Area: 1982 Grade: C 00

N

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"Inter-agency coordination benefiting the citizens of Geauga County"
Robert L. Phillips, P.E., P.S.
County Engineer

Scale 1:5627

http://www.auditor.co.geauga.oh.us/ag/ August 21, 2008

Binnig S-ll

EXHIBIT

306 Between Music + Bell facing West. #1

PUCO HEARING 12
9/10/08 SRD
COURT REPORTERS
OF AKRON CANTON AND CLEVELAND

A

306 Between Music & Bell facing West #2

B

306 Power lines North of Bell St. facing West

New 306, 75' Towers South of Bell St. No Trees Removed/No Houses (Facing North)

1

New 306 75' Towers Again No Trees or Houses (Facing South)

Chardon South St. Would more lines be noticed?

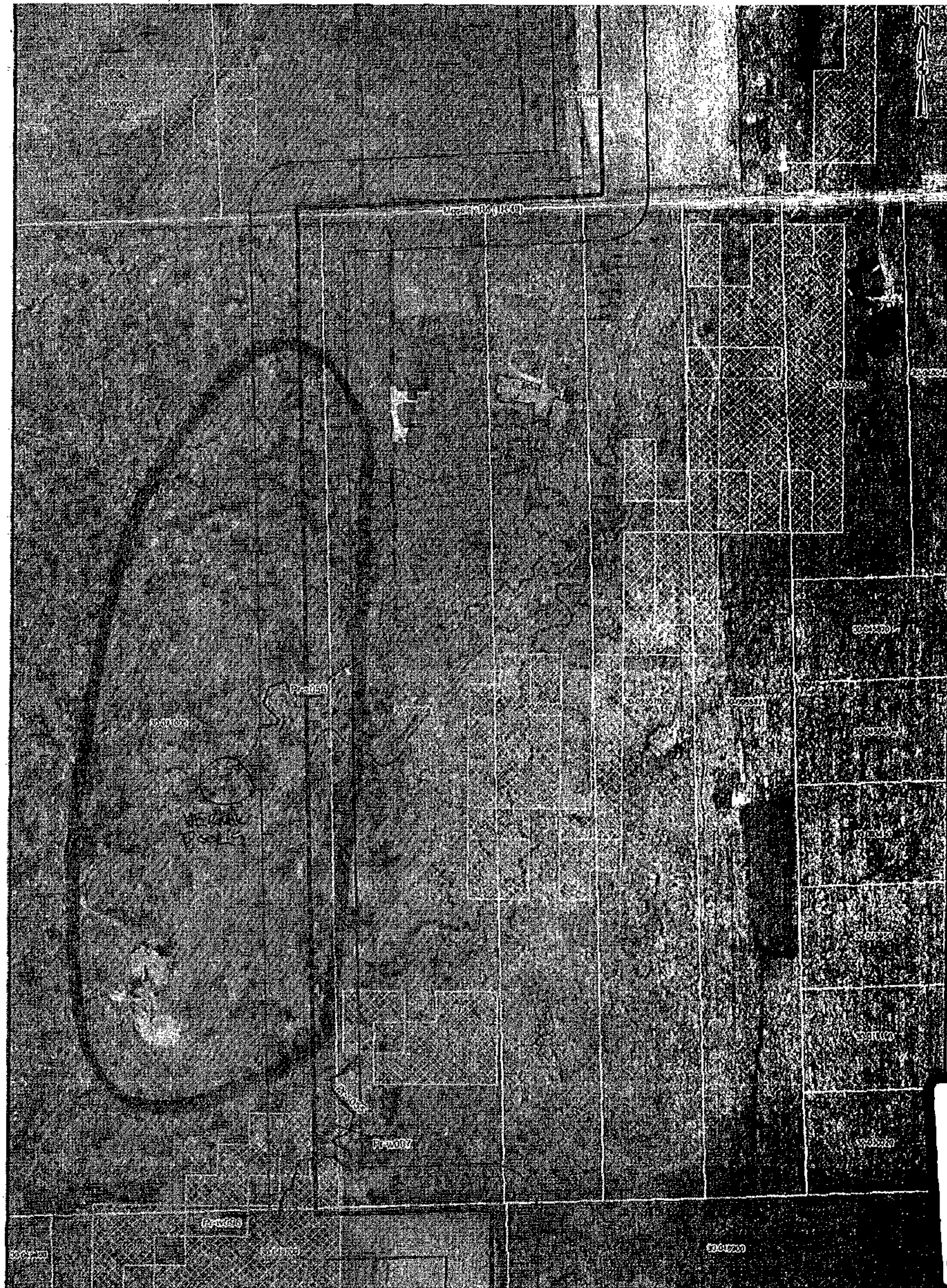
Chardon Rail Easement Area Center St. facing North

4

Bike Path Highway & Power lines Coexisting

5

EXHIBIT



LEGEND:

Preferred Route | 200 Foot Buffer
Existing Transmission Line | OWI Designated Area
Substation | Field Delineated Wetland
Field Delineated Stream | Parcel Boundary

0 200 400
Scale in Feet

BASE MAP SOURCE
Geauga County Auditor, 2006

ATSI | The Illuminating Company | Geauga County 138kV Electric Transmission Line

FIGURE 07-2Y
PREFERRED ROUTE
WETLAND AND STREAM MAPS

JOB NO. 14946398 URS

PUCO HEARING 13
9/10/08 SRD
COURT REPORTERS

YB SAPSUCKER

TABLE 3. DETAILED WETLAND DESCRIPTIONS

Identifier	Wetland Description	ORAM Score	ORAM Category	Wetland Acreage	Linear Feet Crossed	Impacted Acreage	Acres of Forested Wetland that will be Converted
Pr-w012	This PEM/PSS wetland is dominated by *Acorus americanus*, *Onoclea sensibilis*, *Impatiens capensis*, *Cornus amomum*, and *Viburnum recognitum*. It is saturated in the upper 12", has drainage patterns in wetland, water-stained leaves, and passes the FAC-neutral test. Soil is silty clay 10YR 4/2 with mottles (few/distinct) of 10YR 4/4 in the A horizon and silty clay 10YR 5/1 with mottles (many/distinct) of 7.5YR 4/6 in the B horizon.	51	2	0.38	98.0	0.13	0
Pr-w013	This PSS/PFO wetland is dominated by *Viburnum dentatum*, *Onoclea sensibilis*, *Typha angustifolia*, *Carex* sp., *Cornus amomum*, and *Rosa palustris*. It is saturated in upper the 12" with water-stained leaves. Soil is silty loam 10YR 2/1 in the A/B horizon.	38.5	2	0.12	0	0	0
Pr-w014	This PEM wetland is dominated by *Acorus calamus* and an unknown grass. There are drainage patterns in wetland and water-stained leaves. Soil is silty clay 10YR 3/1 in the A/B horizon.	31	2	0.03	0	0.001	0
Pr-w015	This PEM/PFO wetland is dominated by *Viburnum dentatum*, *Impatiens capensis*, *Onoclea sensibilis*, and *Ulmus americana*. It is saturated in the upper 12" with water-stained leaves. The A horizon is silty loam 10YR 4/1 and the B horizon is silty clay 10YR 6/1.	45	2	0.04	0	0.001	0.001
Pr-w016	This PSS/PEM wetland is dominated by *Viburnum dentatum*, *Onoclea sensibilis*, *Impatiens capensis*, and *Ulmus americana*. It is saturated in the upper 12" with water-stained leaves. Soil is silty clay 10YR 3/1 in the A/B horizon.	44.5	2	0.02	7.9	0.01	0

TABLE 3. DETAILED WETLAND DESCRIPTIONS

Identifier	Wetland Description	ORAM Score	ORAM Category	Wetland Acreage	Linear Feet Crossed	Impacted Acreage	Acres of Forested Wetland that will be Converted
Pr-w052	This PFO/PSS wetland is dominated by *Carex lupulina*, an unknown grass, *Rhamnus frangula*, *Acer rubrum*, and *Rosa palustris*. It is saturated in the upper 12", has drainage patterns in wetland, has water-stained leaves, and passes the FAC-neutral test. Soil is silty clay 10YR 6/1 with mottles (20%) of 10YR 6/1 in the A horizon and silty clay 10YR 4/1 with mottles (5%) of 10YR 5/6 in the B horizon.	53.5	2	0.30	68.3	0.10	0.06
Pr-w053	This PFO/PSS wetland is dominated by *Carex lupulina*, an unknown grass, *Rhamnus frangula*, *Acer rubrum*, and *Rosa palustris*. It is saturated in the upper 12", has drainage patterns in wetland, has water-stained leaves, and passes the FAC-neutral test. Soil is silty clay 10YR 6/1 with mottles (20%) of 10YR 6/1 in the A horizon and silty clay 10YR 4/1 with mottles (5%) of 10YR 5/6 in the B horizon.	53.5	2	0.9	313	0.30	0.22
Pr-w054	This PFO wetland is dominated by *Acer rubrum*, *Acer saccharum*, *Ulmus rubra*, *Viburnum recognitum*, *Erythronium americanum*, *Onoclea sensibilis*, *Prunus serotina*, and *Toxicodendron radicans*. It is inundated up to 5", has water marks, has drift lines, and has drainage patterns in wetlands. Soil is 10YR 3/1 in the A horizon and silt loam 10YR 5/1 with mottles (many/distinct) in the B horizon.	53.5	2	0.82	146.2	0.21	0.21
Pr-w055	This PFO wetland is dominated by *Acer rubrum*, *Acer saccharum*, *Ulmus rubra*, *Viburnum recognitum*, *Erythronium americanum*, *Onoclea sensibilis*, *Prunus serotina*, and *Toxicodendron radicans*. It is inundated up to 5", has water marks, has drift lines, and has drainage patterns in wetlands. Soil is 10YR 3/1 in the A horizon and silt loam 10YR 5/1 with mottles (many/distinct) in the B horizon.	53.5	2	0.01	0	0	0

TABLE 3. DETAILED WETLAND DESCRIPTIONS

Identifier	Wetland Description	ORAM Score	ORAM Category	Wetland Acreage	Linear Feet Cleared	Impacted Acreage	Acres of Forested Wetland that will be Converted
Pr-w017	This PSS/PEM wetland is dominated by *Viburnum dentatum*, *Onoclea sensibilis*, *Impatiens capensis*, and *Ulmus americana*. It is saturated in the upper 12" with water-stained leaves. Soil is silty clay 10YR 3/1 in the A/B horizon.	44.5	2	0.02	0	0	0
Pr-w018	This PEM/PSS wetland is dominated by *Viburnum dentatum*, *Cornus amomum*, *Onoclea sensibilis*, *Juncus effusus*, an unknown grass, and *Toxicodendron radicans*. It is inundated up to 1" with water-stained leaves. Soil is silty clay 10YR 5/1 in the A/B horizon.	36.5	2	0.07	0	0.02	0
Pr-w019	This PSS/PEM wetland is dominated by *Impatiens capensis*, *Viburnum dentatum*, *Rosa palustris*, *Onoclea sensibilis*, and *Cornus amomum*. It is saturated in the upper 12" with water-stained leaves. The A horizon is loam 10YR 3/2 and the B horizon is silty clay 10YR 5/1.	33.5	2	0.20	101.0	0.11	0
Pr-w020	This PSS/PFO wetland is dominated by *Nyssa sylvatica*, *Viburnum dentatum*, *Carex* sp., and *Cornus amomum*. It is inundated up to 1" with water-stained leaves. The soil is silty clay 10YR 5/1 in the A/B horizon.	39.5	2	0.15	0	0.02	0.01
Pr-w021	This PSS/PFO wetland is dominated by *Nyssa sylvatica*, *Viburnum dentatum*, *Carex* sp., and *Cornus amomum*. It is inundated up to 1" with water-stained leaves. The soil is silty clay 10YR 5/1 in the A/B horizon.	39.5	2	0.17	36.3	0.07	0.03
Pr-w022	This PSS/PFO wetland is dominated by *Nyssa sylvatica*, *Viburnum dentatum*, *Carex* sp., and *Cornus amomum*. It is inundated up to 1" with water-stained leaves. The soil is silty clay 10YR 5/1 in the A/B horizon.	39.5	2	0.44	111.6	0.15	0.06
Pr-w023	This PSS wetland is dominated by *Viburnum dentatum*, *Impatiens capensis*, *Onoclea sensibilis*, and *Salix* sp. It is inundated up to 1 inch. Soil is silt 10YR 3/1 in A/B horizon.	34.5	2	0.31	94.2	0.12	0

TABLE 3. DETAILED WETLAND DESCRIPTIONS

Identifier	Wetland Description	ORAM Score	ORAM Category	Wetland Acreage	Linear Feet Crossed	Impacted Acreage	Acres of Forested Wetland that will be Converted
Pr-w073	This PSS wetland is dominated by *Phalaris arundinacea, Cornus amomum, Viburnum recognitum, Cornus amomum*, and *Carex vulpinoidea*. It is saturated in the upper 12", has water-stained leaves, and passes the FAC-neutral test. The B horizon is 10.5YR 4/6.	32	2	0.02	0	0	0
Pr-w074	This PSS wetland is dominated by *Phalaris arundinacea, Cornus amomum, Viburnum recognitum, Cornus amomum*, and *Carex vulpinoidea*. It is saturated in upper 12 inches with water-stained leaves and passes the FAC-Neutral Test. The B horizon is .5YR 4/6.	32	2	0.15	27.5	0.06	0
Pr-w075	This PEM/PSS wetland is dominated by *Juncus effusus, Cornus amomum, Carex vulpinoidea*, and *Scirpus cyperinus*. It is saturated in the upper 12". The A horizon is 2.5YR 4/1 and the B horizon is 2.5YR 5/6.	24	1	0.12	28.2	0.04	0
Pr-w076	This PEM/PSS wetland is dominated by *Onoclea sensibilis, Juncus effusus, Carex vulpinoidea, Cornus amomum*, and *Viburnum recognitum*. It is saturated in the upper 12". The A horizon is 10YR 4/3 and the B horizon is 2.5YR 5/2.	24	1	0.10	3.5	0.02	0
Pr-w077	This PSS/PEM wetland is dominated by *Onoclea sensibilis, Viburnum dentatum, Cornus amomum*, and an unknown grass. It is inundated up to 1", has water-stained leaves, and passes the FAC-Neutral test. Soil is silty clay 10YR 5/1 in the A/B horizon.	39.5	2	0.16	52.5	0.06	0
Pr-w078	This PEM/PSS wetland is dominated by *Onoclea sensibilis, Viburnum dentatum*, and unknown grass, with *Nyssa sylvatica* at the edges of wetland. It is inundated up to 1" and has water-stained leaves. The A horizon is silt 10YR 5/1 and the B horizon is silty clay 10YR 5/1.	34	2	0.11	0	0	0

TABLE 3. DETAILED WETLAND DESCRIPTIONS

Wetland Identifier	Wetland Description	ORAM Score	ORAM Category	Wetland Acreage	Linear Feet Crossed	Impacted Acreage	Acres of Forested Wetland that will be Converted
Pr-w094	This PFO/PEM wetland is dominated by *Onoclea sensibilis*, *Impatiens capensis*, *Phalaris arundinacea*, *Carex vulpinoidea*, *Carex comosa*, *Carex gynandra*, *Leersia virginica*, *Juncus effusus*, *Rosa multiflora*, *Iris versicolor*, and *Viburnum dentatum*. It is inundated up to 2", has water marks, has water-stained leaves, and passes the FAC-neutral test. Soil is clay loam 10YR 3/1 with mottles (few/faint) of 10YR 3/3 in the A/B horizon.	55	2	1.88	449.2	0.62	0.37
Pr-w095	This PEM wetland is dominated by *Juncus effusus* and *Scirpus cyperinus*. It is saturated in the upper 12" and has drainage patterns in wetland. Soil is silty clay 10YR 5/1 with mottles (10%) of 10YR 5/7 in the A horizon and silty clay 10YR 6/1 with mottles (10%) of 10YR 5/7 in the B horizon.	30	2	1.19	291.4	0.37	0
Pr-w096	This PEM/PSS wetland is dominated by *Salix* sp., *Cornus amomum*, *Impatiens capensis*, *Onoclea sensibilis*, and an unknown fern. It is saturated in the upper 12", has water-stained leaves, and passes the FAC-neutral test. Soil is silt loam 10YR 3/1 in the A horizon. and silt clay 10YR 5/1 in the B horizon.	22	1	0.08	0	0	0
Pr-w097	This PEM wetland is dominated by *Typha angustifolia*, *Carex* sp. 1, an unknown mustard, *Eupatorium perfoliatum*, *Carex* sp. 2, and *Impatiens capensis*. It is inundated up to 2". Soil is silt 10YR 2/1 in the A horizon and silty sand 10YR 6/1 with mottles (few) of 10YR 5/6 in the B horizon.	41.5	2	0.61	215.4	0.28	0

PV - WL ... / UPL
Upland for Wetland 239Cb

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: Middlefield Applicant / Owner: First Energy Investigator: ML LB	Date: 5/11/07 County: Geauga State: OH
Do normal circumstances exist on the site? Yes X No ___ Is the site significantly disturbed (Atypical situation)? Yes ___ No X Is the area a potential problem area? Yes ___ No X (explain on reverse if needed)	Community ID: ___ Transect ID: ___ Plot ID: ___ Upland Forest

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Fagus grandiflora	Tree	FACU	9.		
2. Fagus grandiflora	Shrub	FACU	10.		
3. Maianthemum canadense	shrub	UPL	11.		
4. Hamamelis virginiana	shrub	FACU	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). 0%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: none (in.)

Depth to Free Water in Pit: none (in.)

Depth to Saturated Soil: none (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ___ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

SOILS

TABLE 1
ANIMAL SPECIES IDENTIFIED OR LIKELY TO OCCUR IN THE STUDY AREA

Birds	*Reptiles and Amphibians*	*Mammals*
American crow	*American toad*	*Coyote*
American kestrel	*Dusky salamander*	*Deer mouse*
American robin	*Eastern box turtle*	*Eastern cottontail rabbit*
American woodcock	*Eastern garter snake*	*Feral cat*
Black-capped chickadee	*Eastern wood frog*	*Fox squirrel*
Blue jay	*Northern green frog*	*House mouse*
Brown-headed cowbird	*Northern leopard frog*	*Long-tailed weasel*
Canada goose	*Northern spring peeper*	*Meadow vole*
Common grackle	*Smallmouth salamander*	*Opossum*
Common snipe	*Snapping turtle*	*Raccoon*
Cooper's hawk	*Spotted salamander*	*Red squirrel*
Downy woodpecker	*Western chorus frog*	*Red squirrel*
Eastern kingbird		*Short-tailed shrew*
Eastern meadowlark		*Striped skunk*
European starling		*White-tailed deer*
Great blue heron		*Woodchuck*
Hairy woodpecker		*Woodland vole*
House finch		
Killdeer		
Mallard		
Northern cardinal		
Northern flicker		
Northern harrier		
Northern mockingbird		
Red-eyed vireo		
Red-tailed hawk		
Red-winged blackbird		
Rock dove		
Rose-breasted grosbeak		
Song sparrow		
Turkey vulture		
Wild turkey		
Wood duck		
Woodcock		

EXHIBIT

Good Evening

Our community has just celebrated our foundings bi-centenial

Huntsburgs original settlers came here from New England and
Established farms, sawmills, stores, churches and schools.
Wild game, timber and rich soil was abundant.

In 1821 we became a township

By 1861 our farmers were sending their sons to war to
preserve the union. 80 years later, our community sent
her sons to preserve freedom throughout the world.
Some of those sons are here tonight.

This community is tied to the land. As it was then,

it is now

Yes, we have seen change. We have a traffic light..
and cable TV.. our Amish neighbors use cell phones
for their businesses.
And many of us still live on the same land that our
ancestors lived on in the 19th century

Some of us are being asked to change this land for the
sake of progress. We are told that the energy needs
of the future require us to sacrifice some of
our pristine land, whos usage and structure have
remained greatly unchanged for 200 years. It is being
suggested that this land's alteration is the best option
to securing our future electrical needs.

We think not.

We are a small band of citizens simply trying
to preserve the community that has been entrusted
to us by past generations. Those who advocate
using this land for power lines are bigger and
richer than we are.

And have lawyers on retainer

and open check books to pay for them.

We have but our voices

And we come here to defend and protect the land
and our heritage.

We are here to speak for the forests, the fields,
the streams, the wildlife .. we are here to speak
for our ancestors and our heritage.

We are not here to argue the need for electricity.
What we are attempting to do is preserve our land
and our heritage the best way we can.

It is our belief that there are other, better options
available than the 528 route and urge you to
consider those alternatives with all due diligence

Thank you

Richard K Briggs

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