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April 28, 2015

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

REFERENCE: Atlantic Coast Pipeline

FERC DOCKET NO.: PF15-6-000

SUBJECT: Scope of Analysis, Establishment of Alternatives, and Total Economic Cost of Pipeline Development.

Dear Secretary Bose:

Thank you for this opportunity to comment on the Notice of Intent to prepare an Environmental Impact Statement regarding the Atlantic Coast Pipeline project proposed by Dominion Transmission, Inc. and Atlantic Coast Pipeline, LLC (80 FR 12163). Your decision to proceed with the preparation indicates that there will be significant environmental impacts. As many have pointed out at the scoping meetings, these impacts will have wide-ranging, important and very large effects on the health, safety, and economic well-being of people, especially those living in communities throughout the region the pipeline will traverse. How large those effects will be and how they compare to a public benefit, if any, are questions, of course for the next stage of the NEPA process.

I am a resident of the affected region and an independent consultant with expertise and 27 years experience in natural resource, environmental and regional economics, including in the context of NEPA processes. On behalf of several community groups in the affected region, including Friends of Nelson County who join me in comments here, my firm is conducting an independent study of several of the proposed ACP's likely economic impacts. Our comments below, therefore, deal primarily with the type and scope of economic analysis that should be part of the coming Environmental Impact Analysis as well as recommendations regarding NEPA process that, if adopted, would ensure a better and more thorough consideration of economic effects.

In general, your economic analyses should focus on the many ways in which the ACP would impose economic costs on people and communities affected by the pipeline, while providing a rigorous examination of the claims of economic benefits based on studies commissioned by Dominion Resources and Dominion Transmission Inc. (Chmura 2014, ICF International 2014). More on this below, but such studies in general, and these studies in particular suffer from two common, but fundamental flaws. The first problem is that they exemplify the misapplication of long-outdated models and black-box estimation tools that have been

empirically proven to be of dubious merit as guides to mid-to-long-term economic development decisions (Richardson 1985; Krikelas 1992; Haynes 1992; and Robertson 2003).

The second is that the studies do nothing to count the external costs of the proposed development. Such external costs would be associated with, at a minimum, the environmental issues already identified in the Notice of Intent.

From an economic efficiency standpoint, external costs are a problem because, being external to the firm imposing them—in this case Dominion Transmission—they do not bear on its decisionmaking the way that expenditures on pipe, payments to contractors, or fees paid to engineering firms do. And when firms don't pay for things, they use too much of them, and society ends up with an overproduction of the good in question and/or an overinvestment in the capacity for producing and delivering that good. We get an inefficiently high amount of natural gas and too much pipeline capacity for delivering it. If economic efficiency reigned, at least some of the funds wasted on excess pipeline capacity would go to higher and better uses, such as investments in energy efficiency or renewable sources of energy.

We environmental economists could prescribe any number of remedies for the problem of external costs. Performance bonding, taxing the polluting activity, properly assigning and enforcing property rights to clean air, clean water and the like, are all mechanisms for, as we put it, "internalizing the externalities" and helping the polluting firm choose a more efficient level of production.

But such prescriptions are more a matter for the Commission's consideration of options to mitigate the effects of its actions and are beyond the scope of these comments. The important thing at this stage is that the Commission do its utmost to understand, estimate and then act upon the best possible information about how large those external costs could be. Indeed one of the most important functions of economic analysis within NEPA is to "unhide" external costs and to make sure they are considered by the public and our servants—in this case, the Commission. The external costs of the ACP—all of them—must be counted if the decisions reached at the end of the process are to make any credible claim to having achieved an efficient or economically desirable outcome.

Before getting to recommendations that will help the commission achieve that result, we would like to address three aspects of the NEPA process that would support an adequate economic analysis.

NEPA Process

1. Purpose and Need for ACP must be examined and established.

As part of the environmental impact assessment process it is imperative that FERC establish a purpose and need for the proposed pipeline. This will require a critical review of the value to the public of having this (or any) additional means by which private companies can more rapidly extract and market natural gas from the Marcellus

region. It is clear that having such means would serve the private interests of Dominion and its partners.

Dominion's private benefits would include what is known to economists as a likely "first-mover advantage," which bestows market power (i.e., the ability to set prices above a competitive level) over the next pipeline to tap into the Marcellus shale. Indeed once one additional pipeline is built (the ACP, say), the market advantages of building a second pipeline (the MVP, perhaps) would be greatly diminished. This is especially so given that the gas resource will, and to a degree quite literally, have evaporated long before any one of the several pipelines proposed for the region have reached the end of its useful life.

Needless to say, a private corporation's desire to establish market power and earn supernormal profits is in no way related to, and should not be mistaken for, a public purpose and need. Instead, FERC must examine such questions as:

- How will gas forced through the ACP be used? Can one expect the gas to be used in service of domestic energy needs, as pipeline proponents have claimed? Or will it, like all energy resources extracted everywhere, simply add marginally to global supply, be sold to the highest bidder and used wherever demand is greatest? By the same token, will the choice of fuel for power generation in Virginia remain a question of relative prices (i.e., which fuel is cheapest) and not, as the "energy security" argument implies, become a question of misplaced patriotic sentiment?
- Given what could be a small impact on global energy prices (which in turn drive local energy prices), can the ACP project be shown to contribute to the goal of the Natural Gas Act of "reasonable prices" for natural gas? To answer this question, FERC must determine how large an effect the ACP would have on global energy prices would be.
- What, if anything, would ACP-delivered gas contribute to "energy security?"
- What, if anything, would ACP-delivered gas have to do with meeting US commitments (assuming they are made) to reduce greenhouse gas emissions, taking into account methane's much greater potency as a greenhouse gas than CO₂, among others, and the question of whether a shift from coal to methane would result in net reductions of emissions of CO₂ equivalent?

2. The Commission must prepare a Regional EIS

The Commission should recognize that each of the multiple pending pipeline proposals, (the ACP, the Mountain Valley Pipeline (MVP) and the Appalachian Connector Pipeline) would serve an identical function, namely the transport of natural gas from the

Marcellus Shale region to regional and global energy markets.¹ NEPA requires that agencies consider such closely related projects as one single project so that cumulative environmental effects of the related proposed actions can be efficiently and effectively considered (40 CFR 1502.4). If the multiple pipeline proposals are considered independently, important cumulative effects, such as on forest fragmentation, industrialization of a pastoral landscape, loss of regional cultural identity, and an attendant decline economic activity and opportunity, are more likely to be overlooked.

Moreover, and as stated in the purposes of the Natural Gas Act, the people of the United States have an interest in “an orderly development of ...natural gas at reasonable prices.” If the Commission permits various pipelines, each of which duplicates the function of one, two, or more other pipelines (including pipeline networks already in place), the predictable result will be an inefficient over-investment in pipeline capacity. As economically recoverable gas becomes more scarce and its price increases, exit from the gas transmission industry would be expected.

But shutting down a pipeline is not like closing a corner grocery store and replacing it with a deli. Pipeline infrastructure and the scars on the landscape will remain for decades, if not longer, and well beyond the pipelines’ profitable lives. Unlike what one might find desirable in some industries or with some enterprises, major infrastructure development likely to entail severe and lasting environmental and economic downsides (see section 6, below), is not the place to be fostering competition and letting “the market” decide which gas transmission company should be left standing. Scenarios such as this are among the “reasonably foreseeable future actions” that the Commission must analyze under the requirement to consider “cumulative impacts” of the proposed action (40 CFR 1508.8).

Conducting a regional EIS will help the Commission avoid this scenario by placing the potential purpose and need for additional natural gas transmission capacity in the proper context of regional / global energy markets. It would first ask whether any additional capacity is needed to get natural gas from the Marcellus to the market. If the answer to that question is yes, the Commission can (and must) then evaluate all reasonable alternatives for achieving that purpose (see below) and, thereby, shine a light on potentially more effective and efficient ways of meeting the public need.

¹ Whether serving this function rises to the level of a public “purpose” and whether there is a “need” for federal action to enable the function are separate considerations.

- 3. The Commission must define and analyze a reasonable range of alternatives, and these alternatives should include, at a minimum, the following:**
- (a) no action;**
 - (b) increased energy efficiency;**
 - (c) expanded use of renewable energy;**
 - (d) use of existing or upgraded natural gas transmission infrastructure;**
 - (d) construction of new pipelines in existing rights-of-way; and**
 - (e) selection among other new pipelines proposed to serve the same function as the ACP.**

I would reinforce the comments of others that the Commission has a legal obligation under NEPA to consider a range of reasonable alternatives, and not merely the routes and alternate routes Dominion has proposed, which are simply minor variations on a single alternative. At a minimum, the Commission must consider a “no action” alternative as well as the use of existing rights of way in which to permit new pipeline capacity (18 C.F.R. § 380.15(e)(1)). If and only if the Commission can demonstrate a public purpose and need to speed the transmission of natural gas from the Marcellus to various markets, then the only reasonable course is to evaluate a range of alternatives to determine the best (i.e., least-cost) way of achieving that purpose.

As suggested by the preceding section and, due to the Commission’s obligation to conduct a regional analysis of the several pipeline proposals, the Commission must, in effect, treat the ACP, MVP and Appalachian Connector proposals as alternatives to each other.

In addition, and as part of its consideration of a no-action alternative it would be “reasonably foreseeable” that actors in the region’s energy market (suppliers, power generators, energy users, et al.) would respond in one or more of the following ways:

- greater utilization of existing excess pipeline capacity;
- upgrading and using existing pipelines;
- more rapid transition to wind, solar and other renewable means of generating electric power, including both utility-scale and distributed power options; and
- enhanced and expanded energy efficiency programs, such as upgrading insulation, lighting, HVAC and other systems in residential, commercial, institutional and industrial buildings.

Each of these would present the possibility of environmental and economic benefits of their own, and their inclusion in the Commission’s analysis will increase the probability that the most environmentally benign and economically efficient outcome will be achieved.

4. Cummulative effects analysis must consider environmental effects along the entire routes and throughout the entire lifecycle of each alternative.

The Commission must consider all the following among the cummulative effects of the pipeline as proposed, and of any alternative that entails expanded natural gas transmission capacity and related infrastructure development in the region:

- Impacts on air, water, soil, wildlife habitat, scenic and recreational amenity and other natural resources at the site of natural gas extraction. Expanded pipeline capacity will reduce the cost of transmission and induce even more, and more rapid, exploitation of fossil energy resources in the Marcellus region. he geographic extent, the overall volume of gas extraction, and the rate at which expansion and extraction occur will have effects on the local, regional and global environment.
- Effects of expanded extraction, transmission and combustion of natural gas on overall greenhouse gas emissions. These emissions include those from equipment used in the development and operation of drilling sites, the construction, operation and maintenance of the pipeline, compressor stations and any associated infrastructure, fugitive emissions of methane at drilling sites, and from transmission facilities. These are in addition to the obvious release of greenhouse gasses from methane combustion in its intended end use, or in explosions resulting from accidents.
- Changes in rural character, loss of community identity and cultural effects of the creeping industrialization of wild and pastoral landscapes. No economic development comes without some costs, but projects such as the ACP are far more likely to tip the pattern of development away from sustainable, locally controlled options and toward a narrower set of options that would further homogenize American life, and bind local people to circumstances and events far beyond their control.

Economic considerations

5. The Commission must not mistake narrow and potentially erroneous estimates of “economic impact” for the economic effects of the proposed action.

Dominion Resources and Dominion Transmission has commissioned and published reports purporting to show the economic impact of constructing and operating the ACP (Chmura 2014; ICF 2014). There are three major problems with these reports as they relate to the question of economic effects of the ACP and, therefore, the Commission’s use of information from them. First, they rely methods that, while popular, are widely discredited for use in policy or planning for periods of more than one year. Second,

while they reveal too few details to fully evaluate the robustness of their results, the studies do appear to be examples of both the misapplication of these methods to the question of long-run effects, as well as employing unrealistic assumptions about initial effects. Third, however poorly these studies answer the questions they do ask, they fail utterly to ask the right question or even to acknowledge the existence of that question. Namely, they focus exclusively on economic activity resulting from construction and operation of the pipeline rather than the full economic effects, both positive and negative, of the pipeline.

Methods are inappropriate for planning

Both the Chmura and ICF reports rely on economic base theory and input-output modeling techniques. Economic base theory holds that economic development springs exclusively from the activities of industries that are deemed “basic” because they produce goods or services for export to other regions. Manufacturing and natural resource extraction are typical examples of basic industries.

Input-output analysis attempts to estimate how changes in the level of activity in a basic industry is translated and multiplied through secondary transactions in the regional marketplace. When a manufacturing firm responds to an increase in demand for its product, it will spend more on the products and services of its suppliers (e.g. for raw materials, for maintenance contracts, and for web design services). In addition, employees of the manufacturing firm and its suppliers spend a portion of their wages and salaries in the local economy. When one totals up the number of times a dollar’s worth of that initial change in demand is turned over in the local or regional economy, one gets the so-called “multiplier effect.”

When properly understood as a way of estimating how a change in activity propagates through the economy over very short periods of time (a year or so), these models and techniques can be useful for illustrating interconnections among industries, households and markets outside the region. Problems arise when, as in the case of the Dominion-commissioned studies, those short-term effects are assumed to be longer-lived or even a permanent fixture of ongoing operations. As Haynes et al (1997) note:

Where the economic base approach gets into trouble is when it is used inappropriately as a tool for planning or predicting impacts of greater than one year in duration; a snapshot of current conditions tells little about the form a region’s future economy may take.

The reason for this indictment is that economic base theory and empirical input-output models grounded in that theory (e.g., IMPLAN, the modeling software used in both studies) assume a static economy. In such an economy, there are no changes in relative prices, no input substitution or technological change in the production processes, no labor mobility, no change in products or consumers’ tastes and preferences for them, no

regional migration, and no changes in state and local tax laws—to name a few. The constant technology assumption, for example, contradicts the fact that technology is always changing and altering the way goods and services are produced. In the example above, input-output models assume it takes the same amount of web design services to increase production of a manufactured good from 100 to 110 units as it does to go from 1,000 to 1,010 or from 1,000,000 to 1,000,010 units.

The upshot of holding technology, relative prices and other key factors constant, input-output models tend to predict higher multiplier effects than are actually experienced (Hoffmann and Fortmann 1996).

These models also have a dismal track record when it comes to their predictions regarding long-run (more than a year into the future) economic growth. Writing in the 25th anniversary issue of the *Journal of Regional Science*, H.W. Richardson, a noted regional scientist, states that 40 years of research on economic base models [to that date] “[had] done nothing to increase confidence in them”. He concludes that that it would be hard to “resist the conclusion that economic base models should be buried, and without prospects for resurrection (Richardson 1985).”

In a later review of 23 studies, Krikelas (1991) statistically compared predictions of the economic base model against the actual experience of the subject regions and found only 4 studies that provided any evidence in support of economic base theory as a long run theory of economic growth. History is replete with cases of communities and areas that had lost their export base (which is one type of initial change that, according to the models, would destroy a local economy) and continued as reasonably successful economies with their social capital intact. (Economic base models would predict the opposite.) The local-serving sectors of the economy and not the “basic” or export-oriented industries are the persistent ones, and new exports simply take the place of the old ones (Newman 1972). Krikelas (1992) concludes that economic base theory has severe limitations, especially for economic planning and policy analysis.

More recently, Robertson (2003) tested predictions from input-output models against actual experience in 15 communities in Southeast Alaska. Not incidentally, that region is one in which many of the assumptions of economic base theory might actually apply. If, in other words, economic base theory can work anywhere, it should work in Southeast Alaska. What Robertson found however, is this:

Export-related activity was not found to cause changes in economic activity serving local demand for the average community.... The implications of these results for policy, and for the theory and practice of modeling economic impacts at small spatial scales, [are that] secondary economic impacts [i.e., “multiplier effects”] cannot be taken as a foregone conclusion in policy analysis.

The concern over the accuracy of regional growth models grounded in economic base theory combined with concerns over the use of these models for planning, suggests that

it would be inappropriate for the Commission to rely on predictions of economic impacts, including the multiplier effect, derived from such models as part of its analysis of economic effects in the NEPA process.

Methods are inappropriately applied.

Unless or until the Commission does incorporate such models or studies based on them into its analysis, a full critique of the Chmura and ICF documents is perhaps unwarranted. It is useful, however to consider how the reports commissioned by Dominion Resources and Dominion Transmission Inc. exemplify the limitations and common misapplication of economic-base models and IMPLAN analysis. Chmura (2014), for example treats the start of ACP's operations—a change in the economy—as an ongoing direct impact. The only way this is possible is if the the human and other resources employed in the pipeline's ongoing operation would otherwise—that is, in a world without the ACP—sit idle year after year for the life of the pipeline.

Contrary to this assumption, people employed in pipeline operations could just as well be employed doing something else. Excavation contractors would be hired to repair roads or prepare sites for resorts, retirement homes or development that capitalizes on the region's natural beauty. And diesel fuel could be used to power farmers' tractors instead of compressor stations. The wages and salaries, as well as the fuel and other costs of operating the ACP, in other words, would simply be profitably deployed elsewhere in the economy. Consequently, a continued lack of a pipeline does not necessarily imply any loss of employment, income, state income tax or any other economic impact relative to the status quo.

Chmura makes the common mistake of counting economic *activity* (the ongoing expenditure of money on the operation of the pipeline) with economic *contribution* or *impact*, which are defined, respectively, as the gross and net changes in a regional economy associated with a *change* in or affecting a particular industry. The start of pipeline operations would be one such change, but that change obviously happens only once.

As Watson et al. helpfully state, the term “‘economic impact’ should be reserved for the narrow results where an industry, event, or policy has the result of either: 1) bringing new revenues into the region that would otherwise not occur in the region or 2) keeping revenues in the region that would otherwise be lost to the region (2007, p. 16).” Because those revenues could be brought into the region for some other purpose (e.g., investment in energy efficiency programs or power generation from renewable resources) it is simply wrong to conclude that the spending on pipeline operations is a unique economic impact.

The ICF study (2015) has a slightly different focus in that it examines the “economic impact” of the lower energy costs that, according to its own models, consumers and

businesses might face after the ACP is operational. Note that because the report does not explain the assumptions behind or the workings of those underlying models it is not possible to evaluate the quality of the predictions that are then fed into the input-output model.

But to give the benefit of the doubt, we might assume that at some point in the future, regional energy prices will dip below what they would otherwise be without the ACP. This would indeed represent cost savings for energy users. In the real economy, people do respond to such changes in relative prices. In this case, people might respond by putting off an upgrade to a more energy-efficient furnace. They might respond by selecting less-expensive, but more poorly insulating, windows for their home renovation project. After all, if energy gets cheaper relative to the cost of other goods, there will be less reason to use it efficiently.

But the IMPLAN model into which ICF feeds its energy-cost-saving predictions is not the real world. It does not allow for input substitution, and the only thing it allows consumers to do with their energy savings is to buy more of everything, including energy, new furnaces and higher-quality replacement windows. Moreover, ICF's analysis implicitly assumes that consumers desire for the same bundle of stuff can never be sated. At no point do people get enough new furnaces and shift their spending into more elaborate vacations (perhaps to places where they can escape the now excessive heat in their homes) into saving for retirement or into their children's college tuition.

Another shortcoming of ICF's analysis is that it does not allow for possible, even likely, responses from other energy suppliers. Namely, the authors assume that differences between the prices paid by consumers for gas transported via the ACP and the price of gas transported via existing or alternative means will persist indefinitely. It assumes, in other words, that operators of the existing pipelines will keep their prices high, even as they begin to face competition from the new pipeline. As any undergraduate economics student knows, such a strategy will not end well for the existing firms. If they are foolish and keep prices high, they will go out of business, at which point ACP will exercise its newfound increase in market power and raise its own prices, thereby erasing the consumers' previous cost savings.

In short, by misapplying input-output modeling to predict long-run economic impacts, these studies present a distorted distorted picture of the positive economic effects of the ACP.

The wrong questions are asked.

The weakness of the methods chosen and other problems with these studies notwithstanding, their fatal flaw is that they completely ignore the fact that the ACP will entail many negative economics effects, including the costs of environmental externalities and subsequent discouragement of investment in other industries. Indeed, the only mention of environmental effects in either study is an unqualified and dubious

claim that switching to natural gas will curb greenhouse gas emissions (Chmura 2014). Aside from environmental effects, neither study considers that other industries may be harmed by the construction, presence and operation of the pipeline, compressor stations and related infrastructure.

Granted, these studies do not explicitly claim to present a full accounting of the net economic effects of the ACP. Ordinarily however, scholars will acknowledge both caveats with their methods and findings as well as the limitations of the scope of their research. These studies should clearly state, therefore, that they are presenting just one side of the story and that parallel additional research would need to be conducted to present a complete set of information before anyone could conclude an overall public economic benefit from the ACP.

Relying on these studies to make decisions about the merits of the ACP is a little like trying to discern the outcome of a football game based on the old University of Virginia Pep Band's halftime joke: "...and here's a partial score: William and Mary, 17."

It would be far worse than just a bad joke for the Commission to use a similarly truncated "score" as its view of the economic effects of the ACP. It must conduct, commission and/or pay attention to serious and rigorous research that shows the full picture, including, of course, the potential gains for some private entities, the losses for other individuals, businesses and industries, and most of all, the costs that will be imposed on the public as a whole.

A fully scoped and accounting for the costs of the ACP would include the vectors of environmental impact described in next section.

6. The Commission must consider the full suite of economic effects of the ACP's construction, operation and presence.

There are three principal pathways by which the ecological, human health, cultural and other biophysical effects of the pipeline will affect human economic well-being: **diminished property value, diminished ecosystem service value, and diminished local and regional development opportunities.** These are the specific manifestations of the external costs that the developers of the ACP propose to impose upon people in the region and beyond. As noted above, without a full accounting for these external costs, it will be impossible for the Commission to know whether and action that permits the ACP to be built and operated would result in net economic benefits.

Diminished Property Values

While there is an understandable focus on the impact the ACP would have on properties actually crossed by the Right of Way (ROW) and the question of how much

compensation those landowners would or should receive, it is both intuitively obvious and empirically demonstrable that property at some distance—perhaps at a great distance—from the ACP’s ROW will suffer a loss of value.

For example, and according to guidelines developed by the US Department of Housing and Urban Development, the evacuation zone for a leak and potential explosion of a pipeline of the size and pressure of the ACP is approximately 1.3 miles wide (Pipeline Association for Public Awareness 2007). Property buyers will quite reasonably think twice about purchasing property on which they and their loved ones would face an elevated risk of injury or death due to their proximity to the pipeline. Any such reluctance on the part of prospective landowners will mean fewer potential buyers for any piece of affected property and, therefore, lower market prices for property near the pipeline.

Mortgage lenders and insurers will certainly notice this danger, and it is possible that lenders will be more reluctant to write mortgages for at-risk properties and/or that insurers will charge higher premiums, assuming they will write policies at all. (The phenomenon would be similar to that already experienced in the shale gas fields of Pennsylvania and elsewhere, where land leased for natural gas extraction has lost favor with lenders and insurers (Barth, 2012 and 2013; Kelly, 2013; Urbina, 2012).) Any reluctance on the part of lenders and insurers to support or facilitate the purchase of affected properties will limit the ability of buyers to buy and will compound the drop in prices due to the buyers’ own reluctance.

Needless to say, such impacts on property values are no more constrained by the boundaries of the ACP’s right-of-way than would be the “thermal flux” the property owners would experience in the event of an explosion.

Risk of incineration is but one of the ACP’s likely means of reducing property values throughout the pipeline corridor. For example, the pipeline corridor will be visual blight marring views from properties well beyond the ROW. It will also detract from the use and enjoyment of properties owned by people who encounter the corridor on their daily commute or as they go about their business in the affected communities. The pipeline corridor will thus make these communities less attractive to current and prospective future residents. With the prospective residents less interested in living in the affected communities, market prices would likely drop, even for properties safely beyond the edge of the ROW, past the edge of the evacuation zone, or even outside the immediate viewshed.

Still other property owners may suffer loss due to the loss of access to, or enjoyment of scenic, and recreational amenities capitalized into what they had paid for their properties. Once the pipeline is in place, such value will no longer be included in the future purchase price of a home, and the paper loss (as well the emotional /

psychological loss) will become a financial loss. Again, these effects would be expected to occur for properties both far from and near to the pipeline itself.

We are aware that the Commission has previously concluded that natural gas pipelines have, at most, an ambiguous and non-permanent effect on property values. In its Final EIS regarding the Constitution Pipeline, for example, the Commission cited two articles that conclude, respectively and in brief, that effects on property value from the presence of a pipeline can be either positive or negative (Diskin et al. 2011) and that a negative effect on property values due to a pipeline explosion diminishes over time (Hansen, Bensen and Hagen 2006). Neither of these studies is definitive for either the Constitution or the ACP pipeline. In one, the subject was a second pipeline in residential areas already home to a natural gas pipeline. In the other, the subject was a liquid petroleum pipeline in the other.

For a number of reasons, the Commission must look beyond these studies to make an adequate examination of the impact of new, large, high-pressure natural gas transmission lines and associated infrastructure (e.g., compressor stations) on property values. One reason already mentioned is that the subjects of those studies differ from the ACP scenarios in some important ways, including the setting, uses, and age of the pipelines. Another is that the Diskin et al. article uses methods that are simply inadequate for the purpose of discerning the effect of a pipeline among the many factors that influence the value of a given piece of property. Hansen, Bensen and Hagen, by contrast, use more robust methods (hedonic price estimation), but their study is not about the effect of the construction of a new pipeline, but rather the explosion of an existing one.

Another important difference is due to the rapidly evolving means by which real estate transactions are formed. The information and tools available to homebuyers have changed dramatically in the nine years since the publication of the hedonic price study, and they changed radically since the explosion in 1999 that triggered the (temporary) drop in land prices its authors discovered.

It is quite possible in that case that the rebound of prices occurred due to a lack of readily available information about the explosion to later purchasers. People buying a home in the years following the 1999 explosion could not query Zillow to see the history of land prices near the pipeline, nor could they explore Google's or other online maps to see what "locally undesirable land uses" exist near homes they might consider buying. Nor did they have access to Youtube and repeated opportunities to find and view news stories, citizens' video, etc. describing and depicting the explosion and its aftermath.

It is not that no such information existed—prospective buyers could always have consulted paper records kept by the local government agencies to learn the sales history, and they could have researched the neighborhood using older techniques. But internet-based tools have certainly changed the ways people shop for homes. We are

now in a real world much closer to the competitive economic model that assumes that all buyers have full information about the homes they might buy.

Even the proverbial space alien landing on earth with an eye toward buying property near the ACP corridor would quickly learn that the property is in fact near the corridor, that there is a danger that the property could be adversely affected by still-pending project approval, and that fossil fuel pipelines and related infrastructure have an alarming history of negative health and environmental effects. Accordingly, the price that s/he (or any human) would offer for a home near the ACP will be lower than the price offered for one farther away or in another community or region entirely.

Diminished Ecosystem Service Value

“Ecosystem services” is a relatively new (~40 year-old) term for an ancient truth: that human well-being—including economic well-being—depends utterly on the existence and productive capacity of natural systems. Forests, rivers, wetlands, and even managed areas such as parks and urban greenspaces, convert sunlight into food and fiber (biomass), filter and purify rainfall and runoff from less natural areas, hold back and slow rainfall when it comes too quickly, and provide opportunities for recreation, spiritual renewal, aesthetic appreciation and other means of supporting human physical, psychological and social health.

As the late U.S. Senator and founder of Earth Day, Gaylord Nelson put it,

“The wealth of the nation is its air, water, soil, forests, minerals, rivers, lakes, oceans, scenic beauty, wildlife habitats and biodiversity.... In short, that’s all there is. That’s the whole economy.”

Accordingly, one of the main ways in which the economic effects of the ACP can be conceptualized, understood and measured is by considering the many ways in which the ACP will affect the capacity of natural systems to produce and deliver ecosystem services, and how changes in that capacity will echo in the well-being of people in and far beyond the vicinity of the pipeline.

From the construction phase, through years of operation (with or without potential leaks, spills, explosions and other accidents), and on to eventual obsolescence and decommissioning, the ACP will alter the ecosystems it crosses. Surface and subsurface disturbance, alteration of watercourses, impacts on groundwater, fragmentation of habitat, visual blight, creation of a corridor for the migration of invasive species, and others are all likely, if not guaranteed, effects of the ACP on the biophysical environment.

The construction and presence of the ACP will entail the conversion of several thousands of acres of land in uses/cover types, such as forests, wetlands and farm fields, that are typically highly productive of ecosystem services, to uses/cover types that are

less-productive, such as shrub/scrub, grasslands, and industrial areas like roads, buildings and other so-called “grey infrastructure.” The conversion will leave each of those acres and the landscape as a whole with less capacity to produce “the benefits to people supplied by nature” to use a common definition of ecosystem services (Reid et al., 2005; USDA Forest Service, 2012).

Some of the affected ecosystem benefits will include: water to drink or as a resource for farms, vineyards, breweries, distilleries and ski areas (snow-making); scenic amenities and recreational opportunities for residents and visitors; food timber and other fiber production; nutritional and cultural value from wild animals enjoyed by hunters and anglers; and protection from injury and property loss, such as through the attenuation of the destructive energy in floodwaters and through the health benefits of breathing clean air. Because these are benefits to people, they have impacts on the human system (individuals, households, businesses, communities, etc.), and they can be measured in monetary terms. Moreover, each will be diminished if and when the ACP is built. The Commission is therefore obligated to consider such effects on the environment, including their manifestation as economic costs, in the NEPA process.

Fortunately, the science and practice of ecosystem service evaluation has advanced rapidly in the past 20 years, and methods are readily available to assist the Commission in this task. A good place to begin is with the “Federal Resource Management and Ecosystem Services Guidebook” (<https://nespguidebook.com/>). The guidebook is designed to help agencies, including some of those with stewardship responsibilities that will be affected by the ACP (USDA Forest Service, National Park Service, Bureau of Land Management, US Fish and Wildlife Service), integrate ecosystem services thinking and analysis into their planning and management.

In addition, there are numerous examples of how the ecosystem services approach and valuation techniques can be applied to illuminate diverse economic consequences of decisions, policies and changes in land use/management. Seminal papers by Costanza et al. (1997, 2012) and Ten Brink, et al. (2009) are among the best known examples covering the value of ecosystem services at a global scale. There are also more local examples, such as Esposito et al. (2011), who estimate the impact of climate change on ecosystem service value derived from US federal conservation lands, including the Monongahela, George Washington and Jefferson National Forests.

In a recent study of a region overlapping much of the ACP’s impact, Phillips and McGee (2014 and 2015) estimate the ecosystem services benefits of *improved* land management and ecosystem restoration in the Chesapeake Bay watershed and the resulting reductions in nutrient and sediment pollution of the Bay. In the case of the ACP, the Commission would of course be estimating the effects of worsened land management and ecosystem degradation resulting from land cover conversion, soil and hydrological disturbance, etc.

To an even greater degree than with impacts on property values, the Commission must recognize that the geographic extent of the effects of the ACP on ecosystem service values stretches well beyond the confines of the temporary construction zone and permanent right-of-way. Indeed, such ecosystem benefits as water for drinking and industrial processes (e.g. brewing beer, making paper, or producing microchips), air purification, flood control, support of species diversity, scenic/aesthetic amenity, and recreational opportunities know almost no boundaries. While one would expect the impact on the value of some of these ecosystem benefits to be felt less severely at greater distances, other impacts would be transmitted undampened to people far beyond the landscape where the land use conversion and ecosystem damage will occur.

The Commission must also recognize and take into account impacts on human well-being that are transmitted by both biophysical processes (e.g. drinking beer) as well as through changes in cultural, psychological or social well-being. Economists generally classify such ecosystem benefits and changes to them as “passive-use values” that, as the name implies, accrue to people without any direct use or experience of the resources or landscape in question. Passive-use values include the following: *option value*, or the value of preserving a resource unimpaired for one’s potential future use; *bequest value*, which is the value to oneself of preserving the resource for the use of others, particularly future generations; and *existence value*, which is the value to individuals of simply knowing that the resource exists, absent any expectation of future use by oneself or anyone else.

Passive-use values are often quite substantial, owing to the large number of individuals potentially affected. Estimating and incorporating these values into federal decisionmaking is also long-established among best scientific practices to ensure a full accounting of the economic effects of federal actions and/or private impacts on the environment. See, for example, Arrow, et al. (1993), National Oceanic and Atmospheric Administration (15 CFR Part 990, 1996) and Rosenberger, Randall and Loomis (2001).

Forgone Economic Development Opportunity

Contrary to common assumptions, including those voiced by Virginia’s Governor at a recent forum on climate change resilience,² areas that would be negatively impacted by the ACP already do have vibrant local economies. Nelson County—the county singled out in the Governor’s remarks as “needing” the Atlantic Coast Pipeline to spur economic development—has a rate of income growth that is faster than the U.S. average and nearly twice the average of Virginia’s non-metro counties (BEA 2015; Headwaters Economics 2015). Needless to say, Nelson and other places like it along the proposed

² In answer to a question about the ACP, Governor McAuliffe responded, in part, by stating that the pipeline was necessary because “Nelson County needs help—they need economic development.” http://library.fora.tv/2015/04/15/headline_interview_virginia_governor_terry_mcauliffe

route of the ACP have achieved this level of economic vitality without the “help” that of a pipeline for transporting natural gas through them would provide.

To the contrary, many of the communities that the ACP would traverse have established a model of economic development that depends on the absence of such “help.”

Nelson County, for example, has excelled in creating and expanding Virginia’s options for destination tourism, for food and beverage manufacturing, for retirement, and as a location for footloose entrepreneurs in information, high-end services and other industries. Among the indicators of this success are that the County’s population, income and employment are rising, that there is rapid growth in non-labor income and sole proprietorships (an indication of the attractiveness of the region to retirees and entrepreneurs), and there has been an increase in employment throughout the service-producing sectors (e.g. medicine, information, etc.) (BEA 2015; Headwaters Economics 2015).

These results reflect the power of the region’s existing economic development engine, namely abundant ecosystem services, a scenic pastoral and wild landscape, relative proximity to regional transportation networks, and easy access to major metropolitan areas. Indeed, Nelson County and others along the pipeline route may well epitomize the “Rural Growth Trifecta” of outdoor amenities, a creative class of workers, and a strong “entrepreneurial context” (innovation-friendliness) (McGranahan, Wojan, & Lambert, 2010).

The ACP would upset this apple cart or, put another way, it would kill geese that are already laying golden eggs in the region. The pipeline will cause loss of ecosystem services, degradation of scenic and recreational amenities, and erosion of community character and cultural heritage while spawning a landscape more dominated by industrial uses and outside interests. The likely result will be that recent investments in appropriate economic development will not perform as hoped, and further development along the same lines will be discouraged. Workers, businesses and retirees who might otherwise choose a location along the pipeline route will opt for locations that retain more of their rural character, their productive and pleasing landscapes, and their quality of life.

Based on testimony at the recent round of FERC scoping meetings and other anecdotal evidence gathered to date, the mere chance that the pipeline could be built has already caused real estate deals to fall apart and economic development plans to be put on hold.³

³ These are based on testimony given by others at the scoping meetings in Lovingson and Stuarts Draft Virginia (March 18 and 19) and on personnel communication with real estate agents, entrepreneurs, landowners and other stakeholders in Nelson County. We are in the process of a more systematic review of comments offered at all of the scoping meetings as well as information on these effects from other sources.

In summary, these economic considerations (ecosystem services, complete property values, and economic development) are not side issues or mere niceties. They are crucial to the question of whether or not the construction, operation, existence and eventual decommissioning of the ACP actually can or will serve the economic interests of the Commonwealth and its constituent communities.

To produce an Environmental Impact Statement that provides complete and credible information about the environmental effects of the ACP, the Commission must analyze each of these economic effects thoroughly and rigorously, and it must weigh the public costs against the private benefits promised by the ACP.

If the pipeline is in fact a “game-changer,” as Virginia’s Governor McAulliffe has opined,⁴ only a full accounting of the likely economic effects of the ACP can shed light on whether the game would actually change for the better. Based on decades of experience researching similar issues around the country as well as analysis of this region to date, it is safe to say that this game, if played according the current plans laid for the ACP, is rigged against a positive economic outcome for many, if not most of Virginia’s communities.

Sincerely,



Spencer Phillips, Ph.D.
Principal, Key-Log Economics

~and for~

Joanna Salidis
President, Friends of Nelson County

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⁴ http://www.richmond.com/business/article_3a9b68a0-3290-11e4-a404-0017a43b2370.html

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