April 28, 2015

Kimberly Bose,
Secretary Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: Dominion's proposed Atlantic Coast Pipeline FERC Docket No. PF15-6-000

Dear Secretary Bose:

I am submitting comments in response to the public notice published by FERC on Feb. 27, 2015 titled: NOTICE OF INTENT TO PREPARE AN ENVIRONMENTAL IMPACT STATEMENT FOR THE PLANNED SUPPLY HEADER PROJECT AND ATLANTIC COAST PIPELINE PROJECT, REQUEST FOR COMMENTS ON ENVIRONMENTAL ISSUES, AND NOTICE OF PUBLIC SCOPING MEETINGS

These comments are for the proposed Atlantic Coast Pipeline (ACP).

General Concerns

FERC NEEDS TO CONSIDER THE REGIONAL, CUMULATIVE IMPACT OF 4 PROPOSED NEW OR MAJOR UPGRADES TO PIPELINES ACROSS THE STEEP, RUGGED CENTRAL APPALACHIANS OF VIRGINIA AND WEST VIRGINIA.

The proposed Atlantic Coast Pipeline, and 2 other proposed 42 inch diameter pipelines; the Mountain Valley Pipeline, and the Appalachian Connector are all planned to serve the same purpose of transporting finished natural gas from the Marcellus field in the Pittsburg-Moundsville area of Pennsylvania, Ohio and West Virginia to Southeastern markets in southern Virginia and the Carolinas. In addition, Columbia Gas Transmission, LLC has filed a Request for Approval to Initiate Pre-Filing Review for the proposed WB Xpress Project for upgrade by 1.3 BCF/day and extension and additional compressor stations of its existing 20 inch gas pipeline across central West Virginia and the north central Shenandoah Valley of Virginia to serve markets in Northern Virginia and a larger portion of West Virginia. It would cross the ACP corridor in Upshur and Randolph counties, West Virginia.

All of these pipelines will have major overlapping impacts to the same cultural, socioeconomic and bioregional area of the Virginia-West Virginia portion of the Central Appalachians. When the numerous alternative routes are considered, there are many areas of overlap in the potential routing of all 4 of the pipelines in some localities. NEPA requires that similar projects in the same area must be considered together in the environmental analysis and not singularly as though impacts were isolated. The same sensitive critical watersheds, 200 year old farming communities, world class outdoor recreation lands and globally unique public wild lands with great biodiversity are in the path of impact from 3 or more of the largest diameter pipelines ever built across 15 to 25 steep, unstable mountain ridges. Full, thoughtful consideration must be given to a regional-scale analysis of the economic needs and impacts, cumulative environmental impacts, and the obvious opportunities for co-location of 2 or more new and/or existing pipeline corridors.

THE PUBLIC HAD NOT HAD SUFFICIENT ACCESS TO CRITICAL INFORMATION DOCUMENTS AND TIME TO CONSIDER THEIR QUESTIONS AND COMMENTS WHEN THE MULTIPLE ALTERNATIVE ROUTES WERE IDENTIFIED BY DOMINION JUST A FEW DAYS BEFORE THE FERC PUBLIC HEARINGS.

All concerned stakeholders need to have timely access to the full scope of information available on the ACP and any other pipeline project proposed in their area and be fully updated on the options for access to comment during the FERC scoping process. This is the fundamentally the intent of the law in the NEPA process. The numerous GIS data files and other detailed information that are needed for all ACP alternative routes must be made available to the public with sufficient time to comment given before the final application for the ACP pipeline project is accepted.

Concerns Related to Water Resources Involving Erosion and Sedimentation

There are innumerable, long, steep often unstable rocky slopes on over 20 named mountain ridges to be crossed in the Alleghenies and the Blue Ridge in the mountainous 150 mile section of the ACP in West Virginia and Virginia before it would reach the Piedmont region.

Analysis of erosion potential on the Shenandoah Mountain area on the western side of the Shenandoah Valley in Virginia was done as a typical example using the RUSLE2 model developed by USDA/NRCS. This model run showed that during the initial phase of pipeline construction with vegetation removed, soil erosion and sediment generation may be approx. 500 times the natural erosion and sedimentation rates that occur on the same slopes with existing mature hardwood and mixed conifer forest cover. [1]

With the implementation of the best management practices for erosion and sediment control during construction, the soil loss and sediment generated would still be approximately 150 times of that under existing forest cover conditions.

This will vary slightly depending on the pace of construction and the adequacy, placement and maintenance of E & S controls and the time of year that construction occurs.

If a successful cover of grass vegetation is established on the mountain slopes at the end of construction, the soil loss and sediment generation would be approximately 20 times what now occurs with the mature forest cover.

As a retired Environmental Engineer with 23 years of field experience in administering compliance in erosion and sediment control, stormwater management and other federal and

[1] Cowpasture River Preservation Association, ACP EIS Comments, April 23, 2015

state environmental regulatory requirements for the Staunton District of Virginia DOT, I know the challenges and complexities of attempting to control erosion and contain sediment on large civil engineering sites. Unless site specific erosion and sediment control plans are carefully developed, reviewed and implemented on the ground by fully qualified professionals, the potential for disastrous soil erosion and stream sedimentation events is certain. Every site has unique soils and bedrock with differing engineering properties, differing precipitation histories and potentials, and surface and groundwater properties that determine the requirements of the specific erosion and sediment control and stormwater management plans.

The FERC planning and procedural documents [2] [3] developed for mitigation of construction phase impacts of soil erosion and sedimentation and stream and wetland crossing areas are targeted to the broad, general types of topographic and generic bedrock situations found in most areas of the U.S. These guidelines and procedures cannot adequately address the sensitive karst limestone ridges and valleys, slopes averaging 25% and many as steep as 90% or more, highly erodible soils, and landslide prone slopes on many miles of the ACP routes. The FERC documents on construction plans and procedures are not as adequate as needed to protect the environmental resources to be crossed by the ACP. The Virginia Erosion and Sediment Control Handbook has been developed with to identify best management practices and the set of 19 Minimum Standards needed to address the field conditions encountered in construction in Virginia. Both the Virginia Department of Environmental Quality and the Forest Management Plan for the George Washington National Forest require adherence to this Handbook. All of the EIS analysis for the Virginia portion of the ACP need to consider the construction mitigation requirements that will be administered by the Va. DEQ and the George Washington National Forest. Extraordinary mountain environmental conditions must be considered and the strictest plans, procedures, inspections and enforcement must be ensured along the ACP route.

There are approximately 12,490 acres of the pipeline study corridor with slopes of 25 to 40 %, and approximately 7520 acres with slopes greater than 40 %.

Regulatory Analysis Needed

- Address the need for strict adherence to the 19 Minimum Standards of the Virginia Erosion Control Regulations 4VAC 50-30, with special attention to Minimum Standard -16a which limits the length of open trenches to no more than 500 linear feet at a time. Dominion will apply for a variance to this standard, but the extreme steep slope acreage that would be involved on so many mountain crossings cannot allow justification for a variance for MS-16a. MS-19 requires management of runoff during construction to

[2] Upland Erosion Control, Vegetation and Maintenance Plan, 2013. http://www.ferc.gov/industries/gas/enviro/plan.pdf

[3] Wetland and Waterbody Construction and Mitigation Procedures, 2013. http://www.ferc.gov/industries/gas/enviro/procedures.pdf

ensure that downstream properties and waterways are protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of storm water runoff. This standard is critical to protecting watershed hydrologic function and preventing channel structure damage and aquatic habitat impacts in receiving streams. MS-19 must be applied to the fullest extent possible in this steep mountainous area with public resource watersheds and aquatic T & E species.

- Construction site plans must be developed which are site specific for each perennial stream and wetland crossing to take into account each unique set of channel cross section, hydrologic and resource conditions. Containment of waste and chemical spills from sites where directional boring beneath stream beds occurs must be carefully planned. Plans must be available for public review and comment prior to EIS completion and final project approval.
- Dominion and other pipeline construction companies have a record of poor compliance with construction best management practices as noted in the case studies presented in the Dominion Pipeline Monitoring Coalition website, www.pipelineupdate.org All regulations which are pertinent to pipeline construction in Virginia and West Virginia must be carefully identified and considered when reviewing and approving Dominion's construction practice documents.
- Strong protocols for plan review and approval, field inspection procedures and responsibilities, documentation of inspections and clearly stated responsibilities for inspectors must be set up. Overlapping federal, state (WVDEP and Va.DEQ) and local jurisdiction inspectors must have responsibilities clearly stated and be fully certified as required by law to provide seamless 24 hour coverage during construction.
- Public Review and input is needed for the ACP Dominion construction plans and procedure documents and any updates or variances proposed.

Landslide and Unstable Slope Concerns

According to the attached compilation and summary of studies (See attachment, Cameron, Jan. 22, 2015), landslides and various slope failures including debris flows of the moderate to large size, 1000 to 20,000+ square meters, are common in the Blue Ridge and Allegheny mountains of Virginia, West Virginia, North Carolina and Tennessee, occurring on the average of every 3 years within the central and southern Blue Ridge and averaging every 11 years in the Allegheny portion of this region. Recurrence interval is a function of watershed scale and climate regime for the same types of bedrock-soil conditions. Orographic lifting of storm event driven moisture is carried upslope in both eastward and westward directions from tropical cyclones in summer and fall and by spring and summer thunderstorms associated with extended wet periods against the northeast to southwest oriented mountain ridges. Late winter and early spring heavy rain events can trigger slope failures due to freeze-thaw frost heaving and rock fracture on several types of shale, siltstone and sandstone sedimentary lithologic sequences in the Alleghenies and in some weathered meta-sedimentary sequences in the Blue Ridge. The ACP will cross at least 125 high elevation 3rd order stream watersheds between mileposts 50 and 155 with a moderate to high potential for rainfall events in the above noted recurrence intervals. Many of these also lie within the vulnerable bedrock types noted.

Types of landslides most common in this area are rotational debris slides in colluvium , translational debris slides on planar surfaces, rock falls on steep slopes with bedding near parallel to the surface, and debris flows beginning as colluvial debris slides in high elevation hollows. [4] [5]

Since 1949 there have been at least 10,000 documented debris flow landslides during significant rainfall events in the eastern West Virginia and western Virginia, Appalachian portion of the ACP route, between mileposts 50 and 155. (Wieczorek, et al, 2009) Since there are very few published research papers on landslides in this area, mostly in the Blue Ridge and along the Virginia-West Virginia border, many more in the area west of the Shenandoah Valley are known have occurred during the same period and prior to 1949, but have not been studied. Dozens of small to moderate sized earth flows, debris slides and debris falls have occurred during 2 moderate, 3 to 5 inch rainfall events in March and April, 2015 in Randolph, Pocahontas and Kanawha counties in West Virginia. Other slides have occurred in the past 6 months in Bath, western Augusta and Highland counties in Virginia. These were exacerbated by snow melt and freeze thaw cycles in Mauch Chunk, Hampshire and Millboro Formations which have similar sedimentary rock sequences. (Ref. VDOT Geologist and MNF Soil Specialist)

The ACP corridor passes through the middle of the area of greatest concentration of debris flow slides documented from Hurricane Camille in Nelson County and across the same ridges in Highland County with known debris slides in Virginia documented in a map by the Virginia Division of Geology and Mineral Resources. (See attached Landslide Maps by Virginia Div. of Geol. & Mineral Resources)

There are at least 2100 acres of slopes in the Allegheny Mountain section, approximately 70 miles, of the ACP study corridor with moderate to very high slope failure potential during heavy rainfall events based on a GIS analysis of three factors which are common to all slope failures in the mountain ridges of the Eastern US during heavy rainfall events. These contributing factors are slope steepness, bedrock type, and the presence of highly erodible soils with a high percentage of silt/clay effecting the shrink-swell factor. (See attachments: Steep Slopes WV and VA and Slope Class and Erosion Hazard Maps) The 45 mile Blue Ridge area section of the ACP route has approximately 1370 acres of moderate to very high slope failure potential. One of the authors of the USGS, Wieczorek, 2009 Report made the statement that these high elevation landslide prone sites are " a loaded gun " waiting for a triggering rainfall event. This

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[4] USGS Fact Sheet 2004-3072; Landslide Types and Processes

[5] Wieczorek, GF, et al,2009, ' An Examination of Selected Historical Rainfall Induced Debris-Flow Events within the Central and Southern Appalachian Mountains of the Eastern U.S.', USGS Report Series 2009-1155

opinion was also expressed by geologists at the Virginia Division of Geology and Mineral Resources.

Other factors contributing to slope failures in this region are permanent or seasonal groundwater near the surface influencing pore water pressure and bedding or fracture planes nearly parallel to the slope surface.(See attached 2015 compilation of debris landslide studies) Construction can increase the effect of groundwater buildup due to compaction and trapping runoff and can exacerbate slippage on surface parallel rock slopes by undercutting or overloading the layers.

The potential for pipeline construction to be impacted by or to induce slope failure is very real. The potential for rainfall events to cause major slope failures which could damage the pipeline surface or undermine the line and cause rupture and explosions and fire are significant enough to warrant a through geotechnical analysis of this threat to both the infrastructure and public safety. Debris flows in the region have scoured to a depth of up to 2 to 3 meters, sometimes more and several have flowed more than a mile downhill. Ridge crest areas are also vulnerable when loose periglacial residuum or fractured ledges of sandstones and quartzites overlie softer beds of siltstones and shale.

The ACP construction will involve 8600 acres of Additional Temporary Workspace outside of the construction right of way for temporary and permanent fill areas for material and equipment staging areas, excess soil and rock material left from trench excavation, tie-in to existing facilities, truck turnaround areas, etc. Dominion Transmission Inc. estimates that up to 1000 of temporary access roads will be required. The total length of permanent access roads is not yet known. These fills can be unstable if not carefully designed and constructed, due to steep existing slopes, causing perched water tables from compaction beneath and increased infiltration within the fill and from overloading slopes already near the threshold of stability. A research paper on case studies of slope stability and failures on 4 sites at reclaimed surface coal mine lands in southwest Virginia was done at Va. Tech by Bell and Daniels [6] and presented at a 1985 surface mining symposium at the Univ. of Kentucky. These sites had experienced slope failure after the fill was placed to the required " Approximate Original Contour" required by law. The major factors found to contribute to the slope failures included excessive pore water pressure buildup in the fill, placing the toe of fill on unstable ground beyond the stable rock bench, placing spoil on too steep slopes, and shear strength reduction in the spoil due to rapid weathering from excessive seepage. All of these are potential factors in the fill scenarios on many miles of steep slopes along the ACP path.

Cases of landslide damage to gas pipelines in the U.S. number in the hundreds and methods and precautions to avoid them are well documented.

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[6] J.C. Bell, W.L. Daniels, VPI, 'Four Case Studies of Slope Stability on Surface Mined Lands Returned to Approximate Original Contour in SW Virginia', , 1985 Symposium on Surface Mining, Hydrology, Sedimentation and Reclamation

Flood Scour Damage Potential

Major flood events have occurred at least 10 times in the ACP corridor since the late 1940's. Regional floods near, at or exceeding the FEMA 100 year flood levels have happened in this area's rivers including 1949(Pendleton Co. WVa.), 1954 (H. Hazel),1969 (H. Camille), 1972 (TS Agnes), 1985 (H. Juan), 1996 (January snow melt & rain), 1996 (H. Fran) and 2003(H. Isabel).

The ACP preferred route between mileposts 50 and 190 would cross at least 25 rivers and creeks with FEMA and USGS hydrologic data giving the flood histories and predicted levels

Significant floods have impacted more local areas such as the June 1949 cloudburst in western Augusta county Virginia and Pendleton County, West Virginia flooding the North River and the South Branch of the Potomac River respectively. The North Fork of the South Branch of the Potomac from upstream of Petersburg to the main South Fork at Moorefield exceeded previous flood peaks. [7] The June 1995 thunderstorm floods in smaller watersheds in Madison, Greene and Albemarle Counties on the Virginia Blue Ridge caused debris flow and flood scour in the Rapidan and Moormans River watersheds. (Wieczorek, et al) The Rapidan had a peak flow of 100,000 cfs, nearly 4 times the defined 100-year flood flow for that location and exceeded the 500 –year defined flow to break all previous records. Several bridges were washed out or severely damaged, including Rte. 230, an important area primary highway. Flood scour caused undermining of bridge piers and abutments and removed significant sections of approach roads in the floodplains, including Route 29, a regionally significant highway. [8]

Analysis Needed for the EIS

- A comprehensive study of the geology along all ACP route alternatives; examining geomorphologic, bedrock and soil factors which are documented to contribute to slope failure. Aerial LIDAR studies and other site investigation methods to identify previous or potential landslide areas are needed.
- A comprehensive review of all landslide research and documentation done pertaining to the Central Appalachian region of West Virginia, Virginia and North Carolina.
- A comprehensive review of all climatological data for the area, including the period of 1872 to 2015. This should include the peak flow rates and elevations of the flood of record for all streams and rivers to be crossed by the ACP.
- A hydrologic analysis must be submitted by Dominion for all temporary or permanent structures that would be placed or constructed in the above noted streams and rivers.

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[7] Stringfield, V.T., Smith, R.C., ' Relation of Geology to Drainage, Floods, and Landslides in the Petersburg Area, West Virginia', Report of Investigations No. 13. May 1956

[8] VDOT Bulletin, Vol. 61, No. 7, 1995.

- A hydrologic analysis must be done on all floodplain cross sections to predict the potential for scour impact on the pipeline during flooding. The potential for flood scour needs to be examined, especially at existing or highly potential overflow channels.
- The potential for access road, work staging, pipe laydown, spoil stockpile and other temporary fill areas in the floodplain or on low terraces in narrow stream gorges to impact flood levels and must be thoroughly analyzed.

Given the many miles of ACP corridor with moderate to severe slope erosion and landslide hazard, careful analysis of all the relevant geology, soils, and climate data, as well as the literature on landslides, is imperative. Taking all the hazards and engineering challenges into consideration, alternative pipeline routes and/or collocation with existing utility corridors may prove to be much more prudent.

Thank you for the opportunity to comment.

Sincerely,

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(540)234-6273

Attachments:

M. Cameron. "Debris Flows, Landslides and Other Slope Failures in the Blue Ridge and Alleghenies of West Va. And Virginia from 1949 to 2003: A Compilatoin and Summary of Studies." Jan. 22, 2015.

Chart of Steep Slope Hazard in WV Counties and National Forest Apr. 28, 2015

Chart of Steep Slope Hazard in VA Counties and National Forest. Apr. 28, 2015

Slope Class and Erosion Hazard Maps (WV_GeologicHazards_MauchChunk-20150416.pdf)

Maps of Landslide Locations

Virginia Landslide Map Overview
Highland County Landslide Map
Nelson County Landslide Map